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1943

RETURNED TO J. P.
MARCH, 1967

Bulletin 1

Series XIV STATE OF NEW YORK Number 2

THE NEW YORK STATE COLLEGE OF FORESTRY

AT SYRACUSE UNIVERSITY

HUGH P. BAKER, Dean

Bul. 1

IN COOPERATION WITH

Forest Service, U. S. Department of Agriculture

HENRY S. GRAVES, Forester

WOOD-USING INDUSTRIES OF NEW YORK

BY

JOHN T. HARRIS

U. S. Forest Service

Published Quarterly by the University, Syracuse, N. Y.

Entered at the Postoffice at Syracuse as second-class mail matter

ALBANY
J. B. LYON COMPANY, PRINTERS
1913

PAGE
Trunks and Valises ... 83
Patterns and Flasks ... 84
Toys ... 86
Clocks ... 87
Elevators ... 89
Whips, Canes, Umbrella Sticks ... 90
Plumbers' Woodwork ... 92
Printing Material ... 93
Shade and Map Rollers ... 94
Brushes and Brooms ... 95
Shuttles, Spools, and Bobbins ... 96
Pulleys and Conveyors ... 97
Dowels ... 99
Gates and Fencing ... 100
Signs and Supplies ... 101
Firearms ... 102
Playground Equipment ... 103
Aeroplanes ... 104
Miscellaneous ... 106
Appendix ... 109
Lumber Production ... 110
Pulpwood Consumption ... 110
Slack Cooperage ... 112
Veneer ... 113
Wood Distillation ... 114
Tanbark ... 116
Wood Uses by Species ... 117
Directory of Manufacturers Furnishing Information ... 136

LIST OF ILLUSTRATIONS

PAGE

Virgin forest of mixed hardwoods and evergreens in the Adirondacks of New York.....Frontispiece
Native hardwoods in Southwestern New York..... 16
The portable saw mill..... 32
Results of logging in the Northern Appalachian section..... 48
Typical scene in the Black Forest of Western Germany..... 64
Typical view of paper mill in Northern New York..... 80
Best type of virgin forest in the Central Appalachian region..... 96

EXPLANATION.

The study upon which this report is based was undertaken by The New York State College of Forestry at Syracuse University in cooperation with the Forest Service, the work being done under the direction of Hugh P. Baker, Dean, and O. T. Swan, In Charge, Office of Industrial Investigations, Forest Service, Department of Agriculture. The report covers the period ending July 1, 1912. By the terms of the cooperative agreement The New York State College of Forestry at Syraucse University is authorized to publish the findings of the investigation.

Much assistance was given by Nelson C. Brown and Edward F. McCarthy of The New York State College of Forestry at Syracuse University, who, together with John T. Harris of the Forest Service, visited all parts of the State obtaining reports on lumbering, manufacturing and forest conditions. Dr. Hugh P. Baker reviewed the text, contributed the illustrations, and supplied much of the data used in the introduction.

Similar reports have been prepared for all of the important lumber-consuming States by the Office of Industrial Investigations, United States Forest Service.

WOOD USING INDUSTRIES OF NEW YORK.

INTRODUCTION.

Closer utilization of forest products is today the greatest problem of the wood using industries. Fifty years ago, when New York led all States in the production of lumber, the problem of waste was almost unknown. At that time the one aim of the superintendent of a plant was to increase the daily output. Today, New York has dropped to twenty-third place among the lumber producing States, and there is increasing need for more efficient consumption of wood material going through the factory. It is estimated that more than half of a tree is lost in the various stages of manufacture leading to the finished commodities. Closer utilization is of vital importance. The rapid decline of New York as a leader in lumber production has been accompanied by a relative increase in the demand for forest products. While her annual lumber production is at present over 525,000,000 feet her own forests and woodlots contribute less than one-third of the raw material consumed by her factories. No problems before the State are more important than the study of closer utilization of forest products, care of the forests, forest fire protection, and reforestation. Of the 34,000,000 acres in the State, 22,000,000 are included in farms and of this, only 15,000,000 acres are actually in crops. This means that 7,000,000 acres of farms are idle; and it is estimated that less than half of the 12,000,000 acres outside of farms, contains merchantable timber. To obtain the most use from all land whatsoever, it is reliably estimated that between 12,000,000 and 14,000,000 acres in the State must eventually be devoted entirely to forests. Such an area is greater than that of Massachusetts, Connecticut, and Rhode Island combined, and is equal to all that part of New York north of the New York Central Line. Improved forest conditions in this large area would mean an enormous saving to the State. Transportation of raw material from the extreme southern States, from Canada, and from the West to supply factories in a forest State results of course in duplication and adds to the cost of forest products. Last year there were sent out through the ports of this State over $15,000,000 for wood to be used in local New York industries. Practically all of the orders for this imported material should ultimately be cancelled. Twelve million acres or more of forest lands in this State should produce all of the 1,754,519,217 feet consumed by the home wood users. If New York will adopt a sound forest policy she can eventually take her former rank as one of the first States in the production of forest products and supply nearly all of the raw material needed by her factories.

The rapid increase in manufacturing in New York has made an abnormal demand for forest products and a consequent influx of timber from Canada, from the Lake States, and from the southern pine region. Douglas fir also has been shipped entirely across the continent for buildings, bridges, car construction and ship masts. Millions of feet of cypress are shipped all the way from the Gulf States to build tanks and silos; red gum from the lower Mississippi Valley is shipped in for interior finish, taking the places formerly occupied by home grown oaks, maples and birches; practically all of the better grades of white pine used in the State comes from the Ottawa River Dictrict in Canada and from the Lake States. The Pacific Coast is called upon to supply millions of shingles for buildings in New York. The western red cedar is so valuable for shingles that it has practically no competition from the home grown woods. Many of the most important wood using industries of the State, including the manufacturers of planing mill products, boxes and crates, sash, doors, blinds and general millwork, furniture, cars, ships, boats, pianos and organs, get most of their raw material from abroad. The ten leading wood using industries consume a total of 436,000,000 feet of home grown wood and purchase from other States the enormous amount of 1,038,000,000 feet. New York's forests and woodlots still contribute to wood using industries over half a billion feet of lumber annually. This condition can not continue long, however, unless the State takes a more active part in the restocking and preservation of her forest areas, and unless lumbermen and manufacturers utilize the forest products more economically. Two important problems confronting State foresters will be to obtain satisfactory reproduction of the more desirable species in the shortest possible time and to increase the growth to the maximum amount which the soil and situation are capable of producing.

Progress in Conservation.

Substantial progress has already been made in the direction of conservation. Three and one-half million acres are enclosed within the so-called "blue line." This line marks the outside boundary of the Adirondack State forest reserve. But of this area the State owns only 1,600,000 acres. Much of the land, except that recently purchased, has been cut or burned over. Improved facilities for fire protection have been recently established. Additional observation towers for locating fires have been built and telephone lines extended. Excellent work has been done by the New York State Conservation Commission in the matter of reforestation of burned and cut-over lands; and while the amount of planting to date is in the aggregate small, it is a splendid start in the right direction. From two to three cents only per acre are now being expended in the Adirondacks for fire protection. It would be good economy for the State to expend two to three times this amount. Large timber owners in the north-

west spend as high as four to five cents per acre and New York can not afford to spend less.

New York is especially favored among the States climatically and otherwise for the production of forests. Favorable conditions of rainfall and soil for splendid forest development exist throughout the State. It is now known that every acre in the forest areas, where there is any soil whatever, will ultimately produce good forests. There is no reason why the Adirondacks should not eventually be covered with as fine a forest as can now be found anywhere in the Black Forest or other forest regions in Europe. Again, market conditions are unexcelled. The forest sections of the State are well equipped with streams and are easily accessible by rail.

The State is awaking in a striking way to proper consideration of her forestry problems. During the past two years the progress made in several lines should appeal to every woodlot owner, lumberman and manufacturer. The New York State College of Forestry is carrying on active State-wide educational work.

Several suggestions have been made for the protection and proper use of the State's natural resources. These are (1) the repeal of the Constitutional provision forbidding the cutting of trees upon State lands, (2) opening of State forests for recreation places for all the people, (3) an increase of the State's holdings of forest lands, (4) extension of the present system of protection, and (5) the introduction of practical economic methods of reproduction.

Closer Utilization of Wood.

With a view of ascertaining practical methods for the closer utilization of forest products and in order that the data may become available to the woodlot owners and manufacturers of wooden products, an investigation was made of the wood using industries of the State of New York by the United States Forest Service. The New York State College of Forestry at Syracuse University cooperated in the collection of data and in the publication of this report.

The scarcity of merchantable standing timber, the loss of raw material sustained in manufacturing, together with the competition of wood substitutes, has forced the attention of all lumbermen to this question. By closer utilization it is hoped to secure more profitable and stable industries, notwithstanding the disturbances caused by competing materials such as concrete, stone and steel. A study of the wood using factories in the United States indicates that about 30 per cent of the entire lumber cut goes into planing mill products, about 20 per cent goes into rough lumber and structural timbers, about 10 per cent into boxes and crating, about 5 per cent into car construction, 3 per cent into furniture, and 2 per cent into vehicles. Two per cent of the cut is used for ties, while 5 per cent is exported. The remainder of the lumber produced goes into miscellaneous uses. In all of these leading avenues of consumption, with the exception

of cross-ties and export stock, wood is subjected at present to competition with other materials. The increasing cost of wood will tend strongly to increase the use of substitutes. Several causes are working, therefore, to embarrass lumber manufacturers: rising stumpage values, increasing cost of production, increasing cost of transportation owing to long haul from the timber areas, and the downward trend toward cheaper production of substitutes.

Studies have been made of the production of forest products from time to time, but no careful study has ever been made to determine what finished articles are made from the rougher forest products, what industries make the greatest demand upon the species, what qualities recommend a wood for its uses, or what steps are being taken to lessen the waste. Probably the major portion of the loss now sustained in waste has been necessary, due to the processes of manufacture, to lack of facilities for easy transportation, to the practical requirements of specifications and commercial grading or to the inability of the plant to profitably utilize waste on mill sites distant from large centers of population. Need of local markets is reported by hardwood operators in the Adirondacks. Large firms operating on birch, maple and beech and other hardwoods use the slab wood unavailable for dimension stock as fuel for the boilers, supplying the power for the sawmill by putting the slabs through a "hog" or shredder in which they are converted into small chips. These chips together with the sawdust readily maintain a good head of steam. But there is a great surplus of such fuel material and apparently there is no outlet at present for this surplus stock. Some operators are reckoning on substituting wood fuel for bituminous coal, provided experiments show this to be economic.

Processes of manufacture have steadily improved, new machinery has been installed to produce minor products, but there is still much room for improvement. Wood distillation plants are consuming sawdust, chips, slabs, and edgings, thereby making better use of waste than its consumption for fuel. The preservative treatment of poles, ties and piling has greatly increased the efficiency of wood, while the consumption of wood for such articles as paving blocks has opened new lines of enterprise. Besides New York is becoming so thickly populated and the general manufacturing business so important that a good market has been developed for all kinds of low grade material. The pulpwood consumption has grown to gigantic proportions in the State and is taking enormous quantities of material of the inferior species.

Difficulties to Overcome.

While much is being accomplished in the closer utilization of wood waste, there are many obstacles to overcome. Many plants in New York State have not enough waste annually to warrant the installation of the special machinery. Again, the waste varies so in shape, size and species that the cost of assorting is almost prohibitive; the location of

the plant may be such that freight rates to consuming centers would absorb all the profits; or the market for any one product may be so limited that the total sales would not justify extensive operations. There are many good localities in New York, however, where the waste of hardwood mills may be profitably converted into squares and other small dimension stock for furniture or novelty factories. The greatest difficulties lie in the disposal of assorted lengths, the assembling of sufficient quantities to justify carload shipments, avoidance of loss in handling due to checking, warping, etc. Several industries might profitably study the possibilities of a central agency to handle their wood waste. In favorable locations minor industries might be conducted in conjunction with lumbering and larger manufacturing establishments. Cooperage manufacturers should be able to utilize much material now wasted in the woods, especially the larger slabs for heading.

Waste in Industries.

Each class of wood user is making use of material that formerly was considered waste. The manufacturers of planing mill products no longer burn shavings and sawdust merely to get rid of it, but sell it for bedding and packing, for refrigerator cars, etc.; while the larger slabs and other pieces go into laths or bundles of kindlings. Spruce and hemlock slabs and edgings are sometimes sold to sulphite pulp manufacturers. The general millwork establishments in cities utilize most of their short pieces and odd lengths in one way or another, even to the turning of small pieces of beech into wooden button forms, clear hardwood short pieces into novelties, mirror and brush backs, and small strips into mouldings.

Several minor industries now depend upon the waste from the major industries for part of their raw material. Toy and novelty manufacturers frequently obtain their stock from the fixture, furniture and general millwork men; camera works obtain the small blocks from the manufacturers of billiard cues; manufacturers of small chair sleds and toy wagons use odds and ends from furniture establishments; while the producers of small mallets and handles obtain much stock from large vehicle establishments.

Veneer.

The widening range of uses of veneer has resulted in the closer utilization of many cheaper woods for packing boxes, berry cups, fruit packages, barrels, drawer bottoms, wooden plates, butter dishes, confectioner's packages, filling in three-ply lumber, etc. Formerly veneer was confined to selected hardwoods where beauty of grain recommended it as exterior finish for high grade furniture. Today the total amount of inferior wood consumed is many times that of mahogany, oak, and other high-grade woods. In New York the consumption of wood for veneer now amounts to 25,000,000 feet annually and is rapidly increasing. This State has been the leading eastern

State in the production of veneers for many years, and its consumption for uses such as boxes and crates has helped the farmers, by allowing them to cut their woodlots with profit. New York city leads in the production of mahogany veneer. The establishments in that vicinity supply industries in every State with high-grade exterior finish in the form of standard veneer 1/24 to 1/28 inch in thickness. While the imported woods are economically sawed into thin veneer, the inferior species of our wood lots are also used along with it for fillers and backing. The veneer industry, therefore, is an economic development in three directions: (1) it multiplies many times the surface for exterior finish, (2) it supplies an increased market for cheaper woods in the high grade finished articles of furniture and fixtures, and (3) it greatly reduces the cost of shipping all kinds of products.

Pulpwood Consumption.

Perhaps no industry in the country utilizes raw material from the forests more completely than the pulp industry. New York is fortunate in having an abundance of raw material for pulpwood and occupies a pre-eminent position among the pulp producing States with respect both to number of mills and quantity of wood consumed. In 1911 New York reported the consumption of over 1,000,000 cords, or nearly 100,000 cords in excess of its nearest rival, the State of Maine. This enormous consumption of spruce, hemlock, poplar, balsam fir, cottonwood and other local species is a most important item to consider in the State's forestry program.

Excelsior is another growing industry that very closely utilizes forest material and New York ranks third in its production, being excelled only by the States of Wisconsin and Virginia. The production of excelsior in New York in 1911 amounted to approximately 20,000 tons of finished product.

Work of Associations.

Lumber associations and trade organizations are aiding in closer utilization. They have for their objects a better understanding of the conditions affecting the lumber market, the establishment of uniform customs, improved methods of drying, the standardization of grades and lengths, increased sale of odd lengths, obtaining favorable transportation facilities, etc. The Association of Box Manufacturers is advocating cheaper freight rates for low grades of lumber and mill waste, the National Hickory Association is making investigations with a view to suggesting improvements in the utilization and marketing of the invaluable hickory stock, the American Wood Preservers' Association is active in exploiting the economic advantages of lengthening the life of ties, poles and piling through preservative treatment. All are working together to increase the efficiency of wood, lessening the drain upon our forests.

Production of Forest Products.

In 1850 New York ranked first in the production of forest products. In 1860 the area of great production had shifted into Pennsylvania; in 1870 Michigan ranked first in production; in 1900 the first position was occupied by Wisconsin; while in 1911 Washington headed all. Thus it will be seen how during the past fifty years the center of production of lumber has shifted westward during each successive decade.

As is shown in supplemental tables, New York is still an important producer of forest products. During 1911 there were 1,520 active sawmills operating in New York and the sawed lumber output amounted to 526,283,000 board feet, which was a gain of 4 per cent. over the production for 1910. A comparison of the lumber cut with the amount of homegrown material going into local factories (548,-236,159 feet) is interesting because it shows a slightly greater total used by the factories than the census returns of the lumber cut. This difference is accounted for by the fact that a large amount of raw material goes into several industries, such as vehicles, furniture, excelsior and agricultural implements in the form of billets, bolts and logs, and is not accounted for by the lumber cut of the State. It is safe to assume that practically all of the New York sawmill output is used by the local wood-using establishments, while much additional local forest products go into factories in the form of logs.

While New York does not rank first in the production of any one species, there are several woods in which the State ranks very close to the top. In the lumber cut of the United States, New York occupies fourth place in the production of beech; fourth place in the production of basswood; fifth place in hemlock, spruce, maple and birch; sixth place in elm; eighth place in ash, and tenth place in the production of chestnut lumber. Several local minor species, including cherry, occupy a leading position in the production by States.

Area Suited for Forest Growth.

It is estimated that there are between twelve and fourteen million acres within the State better suited for forest growth than for any other purpose. A wise forest policy would perpetuate the timber supply of this area and provide for the improvement of the forest stand. The importance of forest planting in the State is very apparent when it is realized how much wood the industries consume and how little the State supplies.

Working for Improvement.

The State Legislature, the State Universities, and the Conservation Commission are working hand in hand for improved forest laws, improved forest areas, increased planting and better fire protection. Surely no State in the Union has more urgent need of immediate action for improving the forest areas than New York.

Summary of Wood Species Used in New York.

The following table (Table 1) shows the relative importance of the various species used for making wooden articles in New York. The total for all species amounts to 1,754,519,217 feet annually, for which the manufacturers pay a total of $53,969,905 or an average of $30.76 per M. feet. The amount of raw material grown in New York was 548,236,159 feet or approximately 31 per cent of all material used by local wood using industries. The following statement shows a total of 83 species contributing to the various industries. In compiling this report, however, it was considered impracticable to distinguish between the various species of certain genera and the data for such were combined. While many firms, for example, reported specifically the use of black ash or white ash, too many others reported its consumption only under the term "ash" and a division would necessarily be so arbitrary as to make it unreliable. The same explanation applies to several others such as spruce, birch, elm, hickory, willow and a number of foreign woods.

The principal local commercial species of spruce are red spruce (*Picea rubens*) and white spruce (*Picea canadensis*). While red spruce is slightly harder and of slower and more uniform growth, the two have the same general mechanical and physical properties and are generally used interchangeably by the various industries without reference to species.

There are three commercially important birches in New York—yellow birch (*Betula lutea*), paper birch (*Betula papyrifera*) and sweet birch (*Betula lenta*). In quantities consumed they rank in the order named, but it is impossible to accurately estimate their relative importance in the wood using industries. The paper birch is lighter and whiter, but all three species intermingle in several industries. Another species, river birch (*Betula nigra*) is not so conspicuous, but grows in many counties of New York. In the northern portion of Michigan and Wisconsin, yellow birch is the all-important species commercially, and the major portion of the 13,628,000 feet of birch imported into New York probably consists largely of yellow birch from these Lake States. In New York the most conspicuous species is yellow birch, and it grows in abundance along the Hudson river and in the northern portion of the State.

Several kinds of ash grow in the State, but white ash (*Fraxinus americana*) and black ash (*Fraxinus nigra*) are the only ones that make important contributions to the trades. White ash is the more important because of its superior strength and elasticity, properties which are very essential in the production of fork handles, hoe handles and certain parts of vehicles. Black ash, though not quite so abundant nor so strong, is very important in many parts of the State, contributing largely to the production of dairymen's supplies. It is capable of taking a high finish and furniture manufacturers can use much of this species. The range of black and white ash over-

lap throughout the State. In general the white ash occupies the better-drained lands and occurs sparsely in the colder swamps, whereas black ash grows generally in the cold swamp land and along water fronts. The latter species is reported to be dying out in the western part of the State. Other species occurring in the State but not of commercial importance are red ash (*Fraxinus pennsylvanica*) and green ash (*Fraxinus pennsylvanica* var. *lanceolata*). Of the eight million feet reported as being homegrown, probably three-fourths of it is white ash. It is safe to assume that practically all of the nine million feet reported as grown out of New York is white ash.

Three kinds of elm grow in commercial quantities within New York—slippery or red elm (*Ulmus pubescens*), white elm (*Ulmus americana*), and cork or rock elm (*Ulmus racemosa*). The latter two are by far the most important. Rock elm is harder and more durable than either and is in great demand for certain parts of vehicles, especially for hubs. White elm, however, is in more general use, particularly in the form of rough lumber and for the production of cooperage stock. Red elm is weaker and not generally sought by wood users.

Several species of hickory are indigenous to the State and their qualities are in many respects so similar that no notice is taken of such differences in the markets. The four species contributing to the New York manufacturing industries are shagbark hickory (*Hicoria ovata*), mockernut (*Hicoria alba*), pignut (*Hicoria glabra*), and bitternut (*Hicoria minima*). The shagbark hickory, locally known as shellbark hickory, is the most important species and is very important in many New York industries, especially those of vehicle stock and agricultural implements. The manufacturers import more than six million feet of hickory annually from the central western States, most of which is the shellbark species.

While shortleaf pine and loblolly pine are tabulated separately, there is more or less confusion of the data. The shipments into New York under the name of "North Carolina pine" contain both loblolly and shortleaf pine. In the early history of the cuttings in the loblolly and shortleaf areas the major portion of the lumber output was loblolly, since the cuttings were in the heavier stands of the lowlands where this species predominates. In recent years the percentage of shortleaf pine has increased as a result of extension of railroads and logging roads into the less accessible hilly areas where shortleaf pine predominates. This tendency to increase the shortleaf percentage of cut is quite noticeable in several states, especially in Arkansas, Tennessee and North Carolina. In the markets most of the loblolly comes under the trade name of shortleaf pine. In the tabulation of these data due consideration was given to the source of the shipments, the price of the raw material and use to which it was put. Where the manufacturer reports the purchase of "North

Carolina pine" and pays a very high price for it, it was assumed that the raw material was shortleaf pine. On the other hand, extremely low grade lumber purchased at a low price was tabulated as loblolly pine. In many instances manufacturers reported the purchase of loblolly pine specifically, but the totals are necessarily somewhat arbitrarily arrived at.

New York manufacturers use many woods that are not grown within the State. The principal shipments from without consist of shortleaf pine (*Pinus echinata*) and loblolly pine (*Pinus taeda*), the combined totals of which amount to approximately 200,000,000 feet annually or over 1/10 of the State's total consumption. Longleaf pine contributes over 64,300,000 feet and it comes from the South Atlantic and Gulf States. Bald cypress (*Taxodium distichum*) is imported in large quantities and is very conspicuous in many industries. It comes generally from Louisiana, but is found in commercial quantities throughout southeastern United States.

Many woods are imported from foreign nations. Mahogany contributes over eleven million feet, most of which comes from Mexico, Central America and the West Indies, but a small amount comes from the northern States of South America. Spanish cedar contributes over 8,500,000 feet and comes from Mexico and Central America for use almost exclusively in the manufacture of cigar boxes.

Circassian walnut comes from southeastern Russia and the adjacent regions of Asiatic Turkey and the Black Sea. Teak comes from India and Siam. The ebony is imported from many countries, but the best grades are supplied by Ceylon, India and Madagascar. A small amount of satinwood finds its way into New York factories and is shipped chiefly from India and Ceylon. Vermillion, which is sometimes known as padouk, is imported from Africa and the East Indies. Lignumvitae comes largely from tropical America and is almost indispensable in the production of many articles, such as bowling balls. Partridge, a favorite cane wood, comes also from tropical America. The chief source of granadillo is Africa, but a few varieties are found in the tropical area of South America. Costa Rica and other points in Central America contribute the small amount of cocobola reported, while nearly all of the malacca comes from India and Burma. Many minor species, such as bamboo, congo, corra, furze, Scotch thistle, weitzel and whangee are purchased in small amounts by the ton, and the shipments are frequently mixed orders so that the price data and quantities can not be separated. English oak is received in veneer form and the price of $341.34 per M. feet b. m. makes it the most costly of all woods used in New York; while vermillion at $300 per M. feet, satinwood at $254.77, teak at $262.42, Circassian walnut at $267.22 and rosewood at $219.89 are among the more expensive woods used by the local factories.

Among the native woods white pine contributes the largest amount.

Photo by Hugh P. Baker.

NATIVE HARDWOODS IN SOUTHWESTERN NEW YORK.

Good type of hardwoods in southern New York. Earlier the best white pine was removed but for the past 30 or 40 years no cutting of any kind has been made. Though a valuable forest there are too few good stems to the acre and young growth is being crowded and injured by over-ripe trees.

Its total of over 422 million feet amounts to almost 25 per cent of the woods used and more than twice the amount contributed by spruce, the next largest quantity reported for any one species. White pine is now and always has been the leading commercial species in New York. When the State occupied first place in the production of lumber white pine stood foremost among American woods, growing in great abundance throughout New England, the Lake States and along the Appalachian Mountains. The wood is light, soft, easily worked, comparatively free from resin and does not warp or shrink badly in seasoning. It has all the essential qualities demanded by a large number of wood using industries, particularly those of sash, doors, blinds, general mill work, pattern work and general planing mill products. Its average price of $27.65 is comparatively low for such high grade stock. New York woodlots contribute over 158 million feet of white pine annually to the wood using industries of the State.

Spruce ranks second in the order of output. Both the red and the white species are common throughout the State, red being the principal one. Its wood is light, soft, stiff, and moderately strong. In several industries, particularly the piano manufacturers and other musical instrument makers, its resonance or capacity to create sound waves makes it one of the most valuable of woods. It is also valuable for paper making on account of its long fiber.

White oak follows spruce closely in the amount of wood contributed. In several industries, such as agricultural implements, vehicles and vehicle stock, white oak is one of the most important species. Its high average price of $46.25 per M. feet f. o. b. factory is evidence of its superiority for most uses. Local woodlots contribute over 30 million feet, or nearly one-fourth of the total white oak consumed in the State. West Virginia, Kentucky, Ohio, Indiana, and Arkansas, supply most of the oak shipped into New York from outside.

Shortleaf pine contributes over 130 million feet and is all imported from the South Atlantic and the South Central States. It goes into the same industries as white pine, being the principal species for general millwork. It is slightly more resinous than white pine, but high grades are very readily worked and make splendid substitutes for white pine in most of the industries.

TABLE I.— SUMMARY OF KINDS OF WOOD USED IN NEW YORK.

KIND OF WOOD		QUANTITY USED ANNUALLY		Average cost per 1,000 ft.	Total cost f. o. b. factory	Grown in New York.	Grown out of New York.
Common name	Botanical name	Feet b. m.	Per cent			Feet b. m.	Feet b. m.
White pine	*Pinus strobus*	422,686,634	24.09	$27 70	$11,706,362	158,109,000	264,577,634
Spruce	*Picea* species	169,107,607	9.64	21 31	3,603,522	76,162,900	92,944,707
White oak	*Quercus alba*	130,421,577	7.43	46 25	6,031,850	30,335,677	100,085,900
Shortleaf pine	*Pinus echinata*	130,134,500	7.42	27 29	3,550,880	.....	130,134,500
Sugar maple	*Acer saccharum*	90,194,650	5.14	27 07	2,441,644	56,905,700	33,288,950
Hemlock	*Tsuga canadensis*	83,028,900	4.73	19 82	1,645,523	49,080,400	33,948,500
Chestnut	*Castanea dentata*	71,054,190	4.05	28 56	2,029,271	13,627,550	57,426,640
Loblolly pine	*Pinus taeda*	70,596,671	4.02	20 77	1,466,092	.....	70,596,671
Longleaf pine	*Pinus palustris*	64,368,715	3.67	32 41	2,086,128	.....	64,368,715
Cypress (bald)	*Taxodium distichum*	60,314,370	3.44	39 97	2,410,846	.....	60,314,370
Red oak	*Quercus rubra*	59,868,300	3.41	38 49	2,304,056	17,282,050	42,586,250
Yellow poplar	*Liriodendron tulipifera*	57,016,880	3.25	40 47	2,307,576	5,250,900	51,765,980
Basswood	*Tilia americana*	56,977,220	3.25	27 36	1,558,801	32,621,350	24,355,870
Birch	*Betula* species	44,136,326	2.52	30 07	1,327,269	30,508,032	13,628,294
Beech	*Fagus atropunicea*	42,546,814	2.43	20 54	873,815	31,492,600	11,054,214
Red gum	*Liquidambar styraciflua*	41,940,175	2.39	29 16	1,222,838	75,000	41,865,175
Cottonwood	*Populus deltoides*	22,778,000	1.30	21 00	478,345	14,508,000	8,270,000
Ash	*Fraxinus* species	17,556,225	1.00	38 49	675,777	8,369,225	9,187,000
Elm	*Ulmus* species	17,310,500	.99	28 37	491,076	8,300,600	9,009,900
Red cedar	*Juniperus virginiana*	16,766,575	.96	37 98	636,774	2,500	16,764,075
Norway pine	*Pinus resinosa*	12,420,300	.71	22 99	285,489	140,000	12,280,300
Mahogany	*Swietenia mahogoni*	11,208,720	.64	138 84	1,556,272	.....	11,208,720
Silver maple	*Acer saccharinum*	8,960,650	.51	25 71	230,379	4,587,400	4,373,250
Hickory	*Hicoria* species	8,755,100	.50	43 03	376,702	2,551,150	6,203,950
Spanish cedar	*Cedrela odorata*	8,582,500	.49	113 11	970,798	.....	8,582,500

Pitch pine	*Pinus rigida*	6,023,600	.34	19 67	118,510	2,231,600	3,792,000
Western white pine	*Pinus monticola*	3,935,000	.23	40 65	159,966	.....	3,935,000
Cherry (black)	*Prunus serotina*	3,242,750	.19	46 22	149,883	748,050	2,494,700
Balm of Gilead	*Populus balsamifera*	3,086,850	.18	19 89	61,411	3,000,000	86,850
Black walnut	*Juglans nigra*	2,629,128	.15	117 15	308,014	570,675	2,058,453
Tamarack	*Lariz laricina*	2,077,000	.12	18 05	37,480	27,000	2,050,000
Sugar pine	*Pinus lambertiana*	1,647,100	.09	46 83	77,140	.....	1,647,100
Arborvitae (northern white cedar)	*Thuja occidentalis*	1,623,600	.09	24 61	39,949	929,700	693,900
Douglas fir	*Pseudotsuga taxifolia*	1,508,600	.09	50 95	76,866	.....	1,508,600
Cotton gum	*Nyssa aquatica*	1,388,616	.08	42 41	58,891	.....	1,388,616
Western red cedar	*Thuja plicata*	1,245,200	.07	30 85	38,415	.....	1,245,200
Balsam fir	*Abies balsamea*	883,800	.05	28 97	25,605	358,800	525,000
Western yellow pine	*Pinus ponderosa*	875,000	.05	37 31	32,650	.....	875,000
Redwood	*Sequoia sempervirens*	767,700	.04	41 74	32,041	.....	767,700
Butternut	*Juglans cinerea*	765,700	.04	37 63	28,813	166,900	598,800
Lignum-vitae	*Guajacum officinale*	663,500	.04	130 26	86,425	.....	663,500
Circassian walnut	*Juglans regia*	622,100	.04	267 22	166,237	.....	622,100
Western larch	*Lariz occidentalis*	450,275	.03	32 51	14,637	.....	450,275
Aspen	*Populus tremuloides*	362,200	.02	17 77	6,436	56,200	306,000
Cucumber	*Magnolia acuminata*	292,500	.02	29 42	8,605	153,000	139,500
Ebony	*Diospyros* species	254,654	.02	122 78	31,266	.....	254,654
Southern white cedar	*Chamaecyparis thyoides*	230,000	.01	58 06	13,354	.....	230,000
Black gum	*Nyssa sylvatica*	210,000	.01	18 29	3,840	.....	210,000
Teak	*Tectona grandis*	190,800	.01	262 42	50,070	.....	190,800
Sycamore	*Platanus occidentalis*	182,712	.01	37 06	6,772	2,700	180,012
Locust	*Robinia pseudacacia*	147,528	*	57 92	8,545	63,900	83,628
Persimmon	*Diospyros virginiana*	94,000	*	98 60	9,268	.....	94,000
Rosewood	*Dalbergia* species	63,710	*	219 89	14,009	.....	63,710
Buckeye	*Aesculus* species	61,400	*	25 98	1,595	2,000	59,400
Witch hazel	*Hamamelis virginiana*	56,500	*	35 88	2,027	.....	56,500
Satinwood	*Chloroxylon swietenia*	51,450	*	254 77	13,108	.....	51,450
English oak	*Quercus* species	36,380	*	341 34	12,418	.....	36,380
Sitka spruce	*Picea sitchensis*	27,000	*	49 07	1,325	.....	27,000
Boxwood	*Tabebuia pentaphylla*	25,000	*	100 00	2,500	.....	25,000
Applewood	*Pyrus* species	23,000	*	66 39	1,527	1,000	22,000

TABLE I.— SUMMARY OF KINDS OF WOOD USED IN NEW YORK — *Concluded*

KIND OF WOOD		QUANTITY USED ANNUALLY		Average cost per 1,000 ft.	Total cost f. o. b. factory	Grown in New York.	Grown out of New York.
Common name	Botanical name	Feet b. m.	Per cent			Feet b. m.	Feet b. m.
Balsawood (corkwood)	*Ochroma lagopus*	20,000	*	$40 00	$800	.....	20,000
Willow	*Salix* species	16,100	*	14 60	235	13,100	3,000
Vermilion	*Pterocarpus indicus*	3,000	*	300 00	900	.....	3,000
Sassafras	*Sassafras sassafras*	1,500	*	21 34	32	1,500	.....
Holly (American)	*Ilex opaca*	1,000	*	100 00	100	.....	1,000
Granadillo (cocowood)	*Brya ebenus*	685	*	113 87	78	.....	685
Cocobola	*Platymiscium* species	480	*	160 42	77	.....	480
Total	.....	1,754,519,217	100.00	$30 76	$53,969,905	548,236,159	1,206,283,058

* Less than 1/100 of 1 per cent

The following woods were purchased by pound or by piece:

Bamboo	Haw	Orange	Rattan
Congo	Hornbeam	Partridge	Scotch thistle
Corra	Lancewood	Pea	Weitzel
Furze	Malacca	Peach	Whangee

SUPPLEMENTAL DATA (FROM CENSUS REPORTS, 1911).

(See Appendix for details.)

Lumber cut (board feet)	526,283,000
Laths produced (number)	41,685,000
Shingles produced (number)	30,301,000
Pulpwood consumption (cords)	1,049,110
Slack staves produced (number)	53,169,000
Heading produced (number of sets)	6,000,000
Hoops produced (number)	351,000
Veneer consumption (feet, log scale)	23,578,000
Hardwood distillation (cords consumed)	132,400
Tanbark, nuts, etc. (tons)	81,711

NOTE: In addition to the above data, much material is used in the form of tight cooperage, crossties, telephone and telegraph poles, but separate figures for New York are not readily obtainable.

SUMMARY OF WOODS USED IN NEW YORK BY INDUSTRIES.

Table 2 shows the relative demands made upon the species by 47 wood-using industries of the State, the average price paid for the raw material delivered at the manufacturing establishments, and a comparison of their consumption of homegrown and imported woods.

The term industry as here used includes the production of articles that are similar or closely related. Under the discussion of each industry that follows Table 2 are enumerated in detail the particular articles that have been combined in the industry. Under modern commercial conditions the woodworking plants have become specialized, the various branches of the general art demanding a particular class of machinery, labor and a certain form of raw material. A study by industries is the only way to point out clearly to woodlot owners just where they may most profitably dispose of their surplus timber, in just what form they are expected to prepare the raw material for the market, and what kinds of wood may be most profitably grown to meet the requirements of the wood-using establishments in a given locality. A study by industries is helpful also to the manufactures of finished products in that it enables them to compare their individual operations with the average for all the manufacturers engaged in a particular branch of the trade. The chair manufacturer, for example, can compare the woods used in his own establishment with the reports from other chair manufacturers; he can study the particular use to which each species is put, the form of raw material used, the general physical and mechanical properties of the species used in various factories and what is being done with the waste. Thus each manufacturer who aided in this investigation may benefit by the coöperation of all and be in a better position to effect economy. A comparison of one industry with another should also result in a benefit to all. The disposal of waste in a large establishment is becoming a serious subject, and the

smaller plants are frequently able to utilize much of the waste about the larger plants. New industries are springing up and sometimes they depend upon the waste of the older industries for their raw material. Even the older industries are learning that they are paying high prices for large clear pieces of timber and lumber when they might as well obtain the smaller dimensions thrown away by a neighboring plant. Small clear blocks of maple, walnut, birch, mahogany and other waste woods that are sometimes used for fuel in a city planing mill might be profitably turned into brush and hand-mirror backs at an adjoining establishment. The discussions of the various industries aim to point out the form and source of the raw material needed by the various industries, the exact uses of the various species, the qualities that recommend them for such uses, the cost of the different woods delivered at the factory, the relative demand made upon our woodlots by the various industries, the form of the waste, and to make some suggestions relative to the practical utilization of the waste.

Table 2 shows the wide range of manufacturing going on throughout the State and the enormous amount of raw material needed annually. No other State has so much capital employed nor so many men engaged in the wood-using industries. In nearly all of these industries New York is conspicuous nationally, while in many of them she occupies first position in the matter of raw material consumed and the value of the finished products. While her planing mill output is exceeded by the output of the more heavily timbered States of the South and West, no other State compares with New York in total consumption of wood for certain classes of finished articles. In the manufacture of packing boxes and crates, the State consumes 370,550,000 feet and consumes more than any other state for sash, doors, blinds, and general millwork. In musical instruments, New York leads all states. This is astonishing to many readers because it has been generally believed that Massachusetts occupies first place in this line. The ship and boat building industry of New York outranks all other states. The total output in this industry for Pennsylvania, Massachusetts, Virginia, California and other states where large ship yards are located does not approach the mark of nearly 38,000,000 feet consumed last year in this State. The industry of boot and shoe findings, the principal article in which is the shoe last, occupies first position among the States. And so it may be said of many others, from the baby industry of aeroplanes to the large industry of boxes and crates, New York is a leader for the consumption of raw material. The cost of the material delivered at the factory covers the wide range from $16.87 per thousand feet at the excelsior plant to the high average price of $104.04 per M. feet at the cigar box factory. The species used for excelsior are available in abundance in the vicinity of the factory, smaller timber may be utilized than can be used for lumber, farmers and other owners of woodlots can supply the plant with billets and bolts by the simple equipment of an

axe or a handsaw, and cut and haul the stock to the factory during the winter months. Cigar box lumber, on the other hand, is generally produced from the imported Spanish cedar log which costs five to ten times as much delivered in New York as the excelsior bolt; expensive mill sites must be acquired, expensive machinery must be installed and maintained, and the logs are reduced to extremely thin veneer, sometimes to one-hundredth inch in thickness, with extreme amount of waste, etc. All other industries have peculiar conditions and individual specifications that cause the costs of raw material to differ widely for the several industries. The following table is intended to give a bird's eye view of the wood using industries of the State.

TABLE 2.—SUMMARY OF WOODS USED BY INDUSTRIES IN NEW YORK

INDUSTRY	QUANTITY USED ANNUALLY		Average cost per 1,000 ft.	Total cost f. o. b. factory.	Grown in New York. Feet b. m.	Grown out of New York. Feet b. m.
	Feet b. m.	Per cent				
Planing mill products	388,191,660	22.13	$27.30	$10,596,797	182,840,050	205,351,610
Boxes and crates, packing	370,550,400	21.12	21.73	8,051,943	66,800,650	303,749,750
Sash, doors, blinds and general mill work	341,277,662	19.45	33.87	11,560,203	94,256,900	247,020,762
Furniture	104,452,092	5.95	41.04	4,286,194	32,717,532	71,734,560
Car construction	76,201,900	4.34	28.32	2,157,905	3,103,700	73,098,200
Instruments, musical	58,816,550	3.35	45.97	2,703,698	21,081,800	37,734,750
Dairymen's, poulterers' and apiarists' supplies	39,045,000	2.23	28.05	1,095,317	9,666,100	29,378,900
Ship and boat building	37,700,500	2.15	41.19	1,553,008	5,195,000	32,505,500
Vehicles and vehicle parts	30,633,100	1.75	43.95	1,346,380	11,122,300	19,510,800
Agricultural implements	28,055,600	1.60	31.29	877,920	9,444,200	18,611,400
Boot and shoe findings	22,882,000	1.30	25.04	572,963	19,541,000	3,341,000
Chairs	21,612,200	1.23	38.43	830,663	11,997,300	9,614,900
Fixtures	20,175,615	1.15	49.37	996,087	5,748,950	14,426,665
Instruments, professional and scientific	19,811,800	1.13	37.91	751,045	1,726,500	18,085,300
Caskets and coffins	18,161,000	1.04	33.13	601,703	621,000	17,540,000
Baskets and fruit packages	18,007,250	1.03	18.51	333,265	14,145,250	3,862,000
Excelsior	14,697,000	.84	16.87	247,990	13,772,000	925,000
Refrigerators and kitchen cabinets	12,268,700	.70	32.14	394,316	3,602,200	8,666,500
Tanks and silos	11,332,950	.65	30.03	340,372	1,470,300	9,862,650
Cigar boxes	10,115,550	.58	104.04	1,052,412	.....	10,115,550
Pumps	9,804,800	.56	28.93	283,625	1,507,300	8,297,500
Woodenware and novelties	8,364,900	.48	29.94	250,448	5,681,400	2,683,500
Frames and moulding, picture	7,514,450	.43	44.74	336,229	1,968,900	5,545,550
Handles	6,474,979	.37	20.52	132,880	5,907,900	567,079
Laundry appliances	5,201,340	.30	30.46	158,414	1,655,500	3,545,840

Machinery and apparatus, electrical	4,602,860	.26	29 10	133,964	2,305,000	2,297,860
Machine construction	4,555,900	.26	34 37	156,568	2,884,000	1,671,900
Sporting and athletic goods	4,230,100	.24	61 04	258,203	1,403,400	2,826,700
Trunks and valises	3,536,000	.20	33 21	117,425	1,211,000	2,325,000
Patterns and flasks	3,388,300	.19	49 43	167,499	1,005,600	2,382,700
Toys	2,994,500	.17	27 36	81,932	1,961,500	1,033,000
Clocks	2,948,159	.17	31 93	94,139	171,227	2,776,932
Elevators	2,663,200	.15	31 06	82,723	698,000	1,965,200
Whips, canes, umbrella sticks	2,237,000	.13	28 33	63,375	2,000,000	237,000
Plumbers' woodwork	1,787,000	.10	37 34	66 730	870,000	917,000
Printing material	1,737 500	.10	37 76	65,615	612,500	1,125,000
Rollers (shade and map)	1,622,500	.09	35 88	58,200	247,500	1,375,000
Brushes and brooms	1,562,500	.09	24 40	38,130	1,172,200	390,300
Shuttles, spools and bobbins	962,000	.05	21 02	20,225	742,000	220,000
Pulleys and conveyors	823,000	.05	46 45	38,227	335,000	488,000
Dowels	753,000	.04	34 38	25,891	703,000	50,000
Gates and fencing	725,500	.04	26 83	19,462	160,500	565,000
Signs and supplies	599,500	.03	28 11	16,853	36,500	563,000
Firearms	370,000	.02	68 65	25,400	.....	370,000
Equipment, playground	250,000	.01	36 28	9,070	157,000	93,000
Aeroplanes	31,400	*	30 83	968	17,200	14,200
Miscellaneous	30,790,300	1.75	29 80	917,529	3,969,300	26,821,000
Total	1,754,519,217	100.00	$30 76	$53,969,905	548,236,159	1,206,283,058

* Less than 1/100 of 1 per cent.

Planing Mill Products.

Planing mill products are those considered as finished upon leaving the planer, such products as flooring, ceiling, siding, moulding, baseboards and other dressed and matched materials. Plain surfaced lumber and dimension stock are omitted from this study because these form the major portion of the raw material consumed by the various wood using establishments.

Of the 388,191,660 feet consumed in the planing mill industry nearly 183,000,000 feet are homegrown. Although the larger consuming centers, like New York, Brooklyn, and Buffalo, are situated on water fronts where enormous quantities of wood are obtainable from outside sources, it is a splendid tribute to the forests and woodlots of the State that they contribute the major portion of the three leading woods — white pine, spruce and hemlock. In the aggregate these three homegrown woods contribute over 136,000,000 feet. The very life of many small wood using industries in inland cities of the State depends upon the continued supply of the important species now grown within the State. The ports of entry can always obtain raw material at low rates from worldwide sources, but inland cities must ever look to local forests and woodlots for their raw material. If proper care is taken of the forest area the factories located in the counties may always depend upon a good supply of raw material near at hand.

The planing mill establishments report the use of 41 different kinds of wood, the average cost of which at the planer is $27.30 per M feet. Twenty-five species are purchased wholly or partly from local woodlots. Homegrown species contributing important amounts are white pine, spruce, hemlock, white oak, sugar maple, beech, red oak, basswood, birch and chestnut. Among woods imported entirely from other states in large amounts are shortleaf pine, bald cypress, longleaf pine, loblolly pine, western white pine, tamarack and western white cedar.

White pine contributes over 30 per cent of the raw material, the major portion of which is homegrown. Its average price of $28.05 per M makes it one of the cheapest of the high grade woods used in this industry. Its cheapness is accounted for in the large amount of white pine timber still available in northern New York. This wood is the most popular wood for general house building purposes in this country. It has all the desirable qualities, being moderately strong and having a fine, straight grain and even texture, easily worked, comparatively free from shrinking and warping, very light in color, only slightly resinous and capable of taking paints, oils and stains well. New York wood users are fortunate in having good pine forests at their factory doors.

Spruce is the next largest contributor, the 75 million feet going into this industry being nearly 20 per cent of all the woods consumed for planing mill products. Like white pine the greater por-

tion of it comes from New York forests. Its price of $20.27 per M is over $7 below the average price for all woods. Spruce is light, soft, straight-grained, of uniform growth, easily worked, takes paint well and is found in great local abundance.

Approximately 75 per cent of the hemlock consumed for planing mill products is grown in New York and this accounts largely for the extremely low average price of $19.73 per M feet f. o. b. factory. Hemlock was neglected in lumber operations until recent years when the scarcity of other woods caused manufacturers to utilize this abundant though inferior species. It is used chiefly for construction work, but it is also valuable for flooring, siding and panel work. The wood is fairly strong, straight-grained and hard, finishes smoothly, works easily and its pleasing grain has brought it into more general favor for interior finish. Shortleaf pine contributes over 29 million feet to planing mill products and is imported from the South Atlantic and Gulf States. Probably there is more or less loblolly pine mixed in with the shipments, because the best grades of the latter species are acceptable in the markets as shortleaf pine.

Bald cypress is of great commercial importance in Louisiana and throughout southeastern United States. It is put to almost every use as an interior trim for houses and is finished in natural color or stained. Containing little resin, it affords a good surface for paint. It is much used for ceiling, wainscoting, panels and to some extent for flooring. It shrinks and warps but little and is therefore used for drain boards, sinks, kitchen cupboards and in places where it is subjected to dampness and heat. For parts of houses exposed to weather it is most serviceable and as siding it practically wears out before it decays. The average price of $45.15 per thousand for over 17,000,000 feet indicates the high regard in which New York manufacturers esteem this southern wood. The consumption of over 14,000,000 feet of longleaf pine is reported by planing mill establishments, for which they pay an average of $30.86 per thousand. It is a valuable wood for all kinds of house-building material. The wood is heavy, hard, very strong, straight-grained, compact, very resinous and is highly desirable for flooring. For interior finish, ceiling, partition and flooring longleaf pine is now extensively used where formerly high grade hardwoods were largely employed. Longleaf pine contributes over 14,500,000 feet and is a favorite flooring material, its hardness recommending it for such purpose.

Nearly one-half of the redwood reported for all industries in New York goes into planing mill products. It is shipped in from California and is used largely for interior finish. Mahogany, Circassian walnut, English oak and teak are used principally in the form of thin veneer for partitions and panel work. English oak, at $350 per thousand commands the highest price of any wood in the industry, but is followed closely by Circassian walnut at $320. The most expensive native wood is black walnut at $113.87.

There is much waste in the rural districts, but the larger planing mills situated in the commercial centers are now saving much material that hitherto was thrown away. Today nearly all establishments sell their shavings and sawdust for one purpose or another, especially for bedding horses, packing ice, etc., while the slabs are generally made into lath and crating; small edgings and strips are turned into mouldings; hardwood strips and blocks into novelties, brush backs, mirror backs, etc., while the softwood ends and strips are frequently turned into articles such as balusters, posts, railings, dowels, hamper covers, slats, and cratings. Basswood ends are re-sawed into ironing boards, while other hardwoods go into such articles as swinging chairs and dimension stock for all other industries using small pieces. The high price of lumber in manufacturing centers encourages close utilization and New York establishments are leaders of the nation not only in economic manufacturing, but in the disposition of waste.

The average cost of the raw material delivered at the planer in New York is $27.30 per M. feet.

TABLE 3.— PLANING MILL PRODUCTS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York Feet b m.	Grown out of New York Feet b. m.
	Feet b. m.	Per cent				
White pine	121,512,700	31.30	$28 05	$3,408,198	69,044,900	52,467,800
Spruce	75,416,560	19.43	20 27	1,528,850	37,818,800	37,597,760
Hemlock	39,437,500	10.16	19.73	778,127	29,547,500	9,890,000
Shortleaf pine	29,106,200	7.50	29 17	849,081	.....	29,106,200
Cypress, bald	17,199,250	4.43	45.15	776,566	.....	17,199,250
White oak	15,337,100	3.95	41 09	630,130	5,926,100	9,411,000
Sugar maple	14,929,500	3.84	25 28	377,399	10,900,300	4,029,200
Longleaf pine	14,546,600	3.75	30 86	448,840	.....	14,546,600
Beech	8,757,400	2.25	20 24	177,217	7,602,400	1,155,000
Red oak	7,677,100	1.98	36 03	276,622	4,180,600	3,496,500
Basswood	7,569,900	1.95	25 29	191,408	5,057,400	2,512,500
Birch	7,382,100	1.90	27 36	201,940	5,021,500	2,360,600
Chestnut	6,170,200	1.59	31 07	191,721	3,685,000	2,485,200
Yellow poplar	5,110,500	1.32	39 94	204,111	172,500	4,938,000
Loblolly pine	3,692,000	.95	29 27	108,077	.....	3,692,000
Norway pine	3,215,800	.83	21 76	69,964	40,000	3,175,800
Red gum	2,244,500	.58	34 69	77,867	50,000	2,194,500
Pitch pine	1,757,600	.45	18 67	32,821	1,754,600	3,000
Ash	1,185,550	.30	36 78	43,602	544,050	641,500
Western white pine	1,050,000	.27	37 38	39,250	.....	1,050,000
Tamarack	1,000,000	.26	18 00	18,000	.....	1,000,000
Western red cedar	999,200	.26	26 39	26,370	.....	999,200
Elm	779,600	.20	18 55	14,462	779,600	.....
Red cedar	318,000	.08	23 85	7,585	.....	318,000
Redwood	302,000	.08	41 13	12,420	.....	302,000
Black walnut	291,600	.07	113.87	33,204	260,100	31,500
Mahogany	238,000	.06	151 89	36,150	.....	238,000
Arborvitae (northern white cedar)	217,000	.06	22 47	4,875	115,000	102,000
Balsam fir	193,000	.05	21 24	4,100	193,000	.....
Cherry (black)	124,000	.03	35 80	4,440	59,000	65,000
Sycamore	102,700	.03	39 69	4,076	2,700	100,000
Sugar pine	100,000	.02	50 00	5,000	.....	100,000
Cucumber	89,500	.02	36 14	3,235	.....	89,500
Douglas fir	29,000	.01	43 10	1,250	.....	29,000
Hickory	28,800	.01	34 48	993	28,800	.....
Silver maple	26,000	.01	24 69	642	26,000	.....
Cottonwood	25,000	.01	21 00	525	25,000	.....
English oak	10,000	*	350 00	3,500	.....	10,000
Circassian walnut	8,200	*	320 00	2,624	.....	8,200
Teak	6,800	*	213 24	1,450	.....	6,800
Butternut	5,200	*	20 19	105	5,200	.....
Total	388,191,660	100.00	$27 30	10,596,797	182,840,050	205,351,610

* Less than 1/100 of 1 per cent.

BOXES AND CRATES, PACKING.

This table includes box shooks, packing boxes, piano and organ shipping boxes, packing crates and all kinds of material used in the industrial establishments for the storage and shipment of factory products. New York is truly the Empire State in manufacturing and naturally the demand for boxes and crating is enormous. The total

annual output of the wood factories in New York amounts to 370,550,400 feet. This industry is second in the State, being exceeded only by the planing mill industry. Adding the wood material put into "Baskets and Fruit Packakes,' containing baskets proper, berry crates and packages, the total output of wood manufactures comes up to 388,557,650. This last industry is a true index to the relative importance of New York in manufacturing. Only one other State rivals New York in the consumption of wood for the packing and shipping of factory products. A comparison of New York's box industry with some of the other leading general manufacturing States is interesting. This comparison includes the totals for baskets and vegetable packages, but does not account for the cigar or tobacco box industry; nor does it include cooperage stock, which is very important in this State. Some other States, including Virginia with a total consumption of over 400,000,000 feet for the production of boxes, are not so important in manufacturing, but produce a large amount of box shooks that are not consumed by home factories. As will be seen, New York and Illinois consume approximately the same amount, while all other important manufacturing States fall far short of their consumption for boxes. Representative figures follow:

	FEET
Illinois	388,699,000
New York	388,557,650
Massachusetts	351,941,350
Pennsylvania	276,587,094
Michigan	232,111,486
Ohio	153,417,273
Wisconsin	119,267,000
New Jersey	102,605,205

Table 4 shows the consumption of 30 different species of wood, the average cost of which delivered at the factory is $21.73 per thousand feet. Boxes and crates can be produced generally from low grade stock. From the standpoint of wood utilization, that is one of the desirable features about the modern manufacturing business. The shifting of the nation from an agricultural to a manufacturing basis has resulted in the increased consumption of all kinds of lower grades of lumber for boxes and crates. Frequently as much lumber is needed to crate a wooden article, like a piece of furniture, as is used in making the article. The kinds and sizes of boxes and crates are so numerous that discussion of their form is impracticable. Box material is generally consumed in the vicinity of its manufacture because freight rates discourage long hauls. Some of the Southern States, however, produce larger amounts of box material in the form of shooks that can be shipped in a knock-down form by carloads to great distances.

The differences in the physical and mechanical properties of the various species are not so important in boxes and crates. Almost any kind of wood can be used in some form or other for crates, the principal recommendation being that it is cheap, light, and capable of holding nails without splitting. Strength, while desirable, is not the first requisite of a box material. In New York white pine naturally combines all the qualities of good box wood and contributes over 35 per cent of the raw material consumed by this industry. Nearly 25,000,000 feet of the white pine is grown within the State. With a few exceptions, the dominant species in any locality contribute most of the material going into boxes. While white pine leads in New York, Illinois, Wisconsin, Massachusetts, and Michigan, it is noticeable that in other States, like Virginia and North Carolina, loblolly pine contributes the larger amount to the industry. In Louisiana, where longleaf pine is the principal species, it contributes most to the box industry. In Kentucky and Arkansas red gum leads all others. This utilization of the most abundant species in a community clearly indicates that the industry does not demand special qualities in woods, but utilizes the nearest suitable wood that is cheap and abundant. In New York other important local woods contributing to the industry are spruce, hemlock, basswood, cottonwood, beech, elm, chestnut, balm of Gilead, birch and sugar maple. Shortleaf and loblolly pine are the principal woods shipped into the State for boxes, their contribution amounting to over 105,000,000 feet annually. As will be noted, the first five species are softwoods. Softwoods are generally of sufficient strength for shipping cases and have the additional advantages of being light, easily worked, comparatively free from shrinking and warping. White pine excels loblolly and shortleaf as a box material. It is not so resinous and hence is better for shipping foodstuffs; its color, being nearly white, is admirable for the display of brands and firm names on packages; and it is more workable than the other species. New York woodlots and forests, if properly cared for, will always be important producers of white pine, spruce, hemlock, cottonwood, and the other important species so much in demand by the manufacturing industries of the community. Some of the less important species, such as beech and elm, are very desirable for certain kinds of crating because of greater strength and toughness. Elm crating, when properly secured by metal cleating, has no superior in strength and toughness. Local woodlots contain much valuable elm stock which brings the highest price of any native wood in the box industry, namely $33.62 per thousand. Only cypress, among the imported woods, brings a higher price than elm.

TABLE 4.—BOXES AND CRATES, PACKING.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
White pine	132,945,200	35.88	$20 89	$2,776,575	24,747,700	108,197,500
Loblolly pine	57,845,000	15.61	19 95	1,154,216	.....	57,845,000
Spruce	48,361,900	13.05	19 85	960,126	15,477,400	32,884,500
Shortleaf pine	47,060,000	12.70	24 32	1,144,654	.....	47,060 000
Hemlock	10,448,900	2.82	19 51	203,859	5,427,400	5,021,500
Basswood	10,289,900	2.78	25 65	263,929	4,369,000	5,920,900
Yellow poplar	9,543,400	2.58	24 72	235,819	88,500	9,454,900
Cottonwood	9,301,000	2.51	26 82	249,450	2,395,000	6,906,000
Beech	7,367,500	1.99	22 23	163,743	3,735,000	3,632,500
Elm	6,862,500	1.85	33 62	230,718	1,354,000	5,508,500
Cypress (bald)	5,524,900	1.49	37 75	208,563	.....	5,524,900
Chestnut	4,380,250	1.18	17 40	76,218	1,612,750	2,767,500
Red oak	3,349,500	.90	15 13	50,660	149,500	3,200,000
Red gum	3,292,700	.89	21 13	69,580	.....	3,292,700
Balm of Gilead	3,086,850	.83	19 89	61,411	3,000,000	86,850
Pitch pine	2,765,000	.75	18 87	52,180	245,000	2,520,000
Norway pine	1,975,000	.53	17 29	34,130	.....	1,975,000
Birch	1,836,000	.50	19 26	35,370	1,636,000	200,000
Sugar maple	1,689,400	.45	16 77	28,331	1,650,900	38,500
Silver maple	771,000	.21	17 35	13,376	508,500	262,500
Longleaf pine	568,000	.15	23 87	13,560	.....	568,000
Aspen	316,000	.09	18 61	5,880	10,000	306,000
Ash	248,500	.07	19 38	4,815	173,500	75,000
White oak	220,500	.06	21 00	4,631	120,500	100,000
Black gum	210,000	.06	18 29	3,840	.....	210,000
Balsam fir	100,000	.03	18 00	1,800	100,000	.....
Buckeye	50,000	.01	26 00	1,300	.....	50,000
Tamarack	50,000	.01	20 00	1,000	.....	50,000
Sycamore	50,000	.01	28 00	1,400	.....	50,000
Cotton gum	41,500	.01	19 50	809	.....	41,500
Total	370,550,400	100.00	$21 73	$8,051,943	66,800,650	303,749,750

SASH, DOORS, BLINDS AND GENERAL MILLWORK.

New York wood users report the consumption of 50 different species in the manufacture of sash, doors, blinds and general millwork, with a total annual consumption of 341,277,662 feet, the average cost of which is $33.87 per M feet f. o. b. factory. This industry overlaps the planing mill industry to some extent. Table 5 consumes raw material that is one step further removed from the forest as compared with planing mill products and the cost of the raw material is over $8 per M in excess of the latter industry. Generally the establishments manufacturing sash, doors, and general millwork are located in cities and villages where the raw material comes to them in the form of rough and surfaced lumber, whereas the planing mill products use a great amount from the logs. General millwork establishments manufacture a great variety of articles, but the most important items turned out are balusters, baseboards, blinds, cabinets, columns, cornice work,

Photo by W. C. Shepard

The portable saw mill promises to be an important factor in the utilization of future forests in New York. There is really a very large amount of valuable timber standing in woodlots in New York and proper cutting of these woodlots combined with cooperative marketing of products will give farmers and land owners very excellent returns from their hill and ridge lands. It is to be hoped that the use of the portable mill will be developed and that market conditions may be improved by cooperation on the part of woodlot owners.

doors, grills, mantels, newel posts, porch work, posts, railing, sash, screens, scroll work, shutters, stairwork and window frames.

Workableness, combined with the capacity to take oils and paints well, are the principal requirements of woods that go into general millwork. White pine is unexcelled for this industry and occupies first place. For articles such as balusters, columns, posts, scrolls, and stairwork white pine is used almost exclusively. Its clear grain and the ease with which it may be cut makes it a favorite for scroll and cornice work, and it is preferred above all other by cabinet makers. It occupies a position of leadership in all of the States where the wood grows and not infrequently it is a leader in contribution to many of the industries in States where no white pine is grown, being shipped into distant States like Iowa, where it is given preference over all other woods for the manufacture of sash, doors, blinds and patterns. Its superiority over native woods of other communities for general millwork is patent when more of it is consumed in many States than of native woods.

Next to the white pine in New York comes bald cypress with a contribution of over 29,000,000 feet. Nearly 50 per cent of all cypress used in New York goes into general millwork. It is imported from Louisiana and the Southern States because of its special suitability for such articles as screens, baseboards, window frames and other places where its capacity to resist decay is of great importance. Hemlock is third in importance and three-fourths of the raw material is grown within the State. White oak is used largely for high grade finish, such as mantels, where it is used on account of its beautiful grain. It is capable of taking a high polish and when quarter-sawed it has a conspicuous "silver grain," which makes it most attractive for exterior parts of interior finish. It shrinks badly and is apt to check in seasoning, but next to mahogany it is considered by many to be the most beautiful wood for interior finish. Red gum, imported from the central southern States, is extremely popular because it can be made to imitate Circassian walnut and other high grade woods. The raw material goes into the State at prices that compete with local woods and it is used in nearly all of the larger hotels and apartment-houses in one form or another as decorative material. Longleaf pine is used extensively for doors. Frequently it is combined with white pine in the same door, the longleaf pine forming the panels and the white pine forming the rails and stiles. The conspicuous medullary rays of the southern pine present a pleasing contrast to the plain, obscure grain of the white pine of the North. Immense quantities of both longleaf and shortleaf pine are made into sash and doors, while smaller quantities are used for railing, balusters, stairs, newel posts, columns and kitchen cabinets. Because of their hardness, sugar maple and longleaf pine are favorite woods for doorsills.

Many woods give evidence of their suitability for certain uses in this industry by coming extreme distances, among them being western

white pine from California, sugar pine from southern Oregon and California, redwood from California, western yellow pine from Idaho, western red cedar from Washington and Sitka spruce from Washington; while a number of species like Circassian walnut, teak, ebony, English oak, rosewood and mahogany come from the uttermost parts of the world to contribute to the manufacture of interior trim, carvings, cabinets, etc. Mahogany is a favorite wood for revolving doors in large hotels and office buildings. The hard foreign woods such as ebony, rosewood and teak take a high polish and are made largely into carvings for interior decoration. Mahogany, Circassian walnut, English oak and white oak are used largely in the form of veneer, with chestnut and yellow poplar for backing or cores. Chestnut is used principally, however, for interior finish and for doors. Western white pine, sugar pine and western yellow pine go largely into sash and doors. Yellow poplar is frequently preferred for columns, newels and screen frames, while cherry is in great demand for casings and cabinets. The large amount of birch consumed is indicative of a very wide range of uses, but it is generally used in connection with mahogany as an interior finish.

Several woods, including elm, cottonwood, aspen, hickory and locust, appear to be rather out of place in this industry because they do not have the general qualities of workability, beautiful grain or capability to take a high finish; but their presence in small amounts is accounted for by the wide range of the industry, including everything from the repairing of porches in humble cottages to the finishing touches on the most expensive grills in New York City.

This industry more closely utilizes waste than general planing mills located in rural districts. In the large commercial centers the general millwork establishments have very little waste, selling their sawdust, kindling wood and shavings and manufacturing very small articles. The best waste lumber is made into cores or fillers for veneered doors, while small strips are made into mouldings, dowels, lattice, etc. Small blocks are turned into brackets, corners, base blocks, carvings, novelties and brush and mirror backs.

Over 94,000,000 feet of raw material used comes from local woodlots and forests, with white pine, hemlock, spruce, birch, red oak, white oak, chestnut, sugar maple and basswood contributing in the order named; white pine furnishes 52,000,000 feet, or over 50 per cent of the home-grown raw material. Among the woods grown out of New York but within the United States bald cypress, shortleaf pine and longleaf pine are by far the heaviest contributors. Among the foreign woods mahogany is the most important species contributing over 1,172,000 feet as against only 144,550 feet of Circassian walnut, the next most important foreign species. Tamarack, which goes largely into the plainer interior work, is the cheapest native wood, $17.97 per thousand, while black walnut is the highest priced native wood, $114.21 per thousand. Among the foreign woods Circassian walnut brings the

highest price, $303.63 per thousand. The grand total expended by New York manufacturers for raw material going into sash, doors, blinds and general millwork was $11,560,203, which is over 20 per cent of the total cost of all raw material consumed by the wood using industries of New York and $1,000,000 more than the amount expended for the 338,000,000 feet going into planing mill products.

TABLE 5.—SASH, DOORS, BLINDS, AND GENERAL MILLWORK.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
White pine	116,420,300	34.11	$32 42	$3,774,443	52,000,000	64,420,300
Cypress (bald)	29,617,270	8.68	37 60	1,113,671	.....	29,617,270
Hemlock	26,436,600	7.75	20 44	540,352	11,187,600	15,249,000
White oak	25,801,500	7.56	49 78	1,284,369	3,436,600	22,364,900
Red gum	23,494,000	6.88	27 53	646,798	.....	23,494,000
Shortleaf pine	21,105,200	6.18	28 30	597,359	.....	21,105,200
Chestnut	13,324,200	3.90	36 17	481,983	2,900,500	10,423,700
Spruce	12,721,600	3.73	23 34	296,966	5,439,600	7,282,000
Longleaf pine	12,650,615	3.71	32 22	407,601	.....	12,650,615
Yellow poplar	10,908,750	3.20	42 75	466,374	1,283,500	9,625,250
Birch	10,695,800	3.13	35 55	380,258	5,004,900	5,690,900
Red oak	9,609,400	2.82	45 76	439,695	3,597,300	6,012,100
Sugar maple	6,383,200	1.87	27 22	173,669	2,879,200	3,504,000
Basswood	5,027,400	1.47	27 47	138,088	2,537,000	2,490,400
Western white pine	2,462,000	.72	41 37	101,865	.....	2,462,000
Beech	2,271,600	.67	23 53	53,443	1,596,600	675,000
Silver maple	1,432,000	.42	27 78	39,780	582,000	850,000
Sugar pine	1,397,100	.41	43 15	60,290	.....	1,397,100
Ash	1,187,000	.35	40 83	48,471	669,000	518,000
Loblolly pine	1,179,100	.35	27 78	32,752	.....	1,179,100
Mahogany	1,172,697	.34	149 97	175,871	.....	1,172,697
Tamarack	1,015,000	.30	17 97	18,240	15,000	1,000,000
Norway pine	772,500	.23	20 32	15,695	.....	772,500
Elm	695,300	.20	20 77	14,439	673,300	22,000
Western yellow pine	675,000	.20	40 22	27,150	.....	675,000
Balsam fir	576,800	.17	33 68	19,429	51,800	525,000
Douglas fir	571,100	.17	44 82	25,596	.....	571,100
Black walnut	422,000	.12	114 21	48,195	257,000	165,000
Redwood	205,000	.06	38 80	7,955	.....	205,000
Circassian walnut	144,550	.04	303 63	43,889	.....	144,550
Red cedar	129,200	.04	44 17	5,707	2,000	127,200
Western red cedar	127,000	.04	48 23	6,125	.....	127,000
Cotton gum	117,500	.03	32 30	3,795	.....	117,500
Cherry (black)	116,900	.03	67 04	7,837	63,600	53,300
Teak	100,000	.03	287 50	28,750	.....	100,000
Pitch pine	72,000	.02	23 82	1,715	72,000	.....
Witch hazel	56,500	.02	35 88	2,027	.....	56,500
Ebony	50,000	.01	262 50	13,125	.....	50,000
Satinwood	33,000	.01	258 18	8,520	.....	33,000
Sitka spruce	25,000	.01	45 00	1,125	.....	25,000
Locust	20,000	.01	100 00	2,000	.....	20,000
Cottonwood	15,000	*	40 00	600	.....	15,000
Butternut	10,500	*	61 15	642	4,700	5,800
Cucumber	10,000	*	50 00	500	.....	10,000
English oak	6,380	*	302 19	1,918	.....	6,380
Buckeye	5,400	*	26 85	145	2,000	3,400
Arborvitae (northern white cedar)	4,000	*	60 00	240	.....	4,000
Rosewood	3,000	*	233 33	700	.....	3,000
Aspen	1,200	*	22 00	26	1,200	.....
Hickory	500	*	40 00	20	500	.....
Total	341,277,662	100.00	$33 87	$11,560,203	94,256,900	247,020,762

* Less than 1/100 of 1 per cent.

Furniture.

The furniture industry in the State is extremely important, leading all specialized industries and ranking next to the three general industries of planing mills, boxes and crates, and sash, doors and blinds. New York occupies a leading place in the manufacture of furniture. It is not generally known that the great furniture manufacturing State of Michigan falls far short of the total production in New York, that State consuming a total of 81,476,554 feet annually as compared with 104,452,092 in New York. Illinois is probably the largest producer, her total consumption of wood for furniture, including couches, davenports, kitchen safes and cabinets, reaching approximately 113,000,000 feet. North Carolina is another rival for leadership in the consumption of wood for furniture, her total amounting to 92,865,000 feet. The latter State leads New York and Illinois if the allied industry of chairs is added to furniture. The combined total for chairs and furniture in North Carolina is 138,820,000 feet as against 126,064,292 feet for chairs and furniture in New York, and 131,000,000 feet for Illinois. Wisconsin's combined total consumption for furniture and chairs is 97,327,000 feet and that of Michigan is 91,299,554 feet. No other States approach the enormous consumption of these few States.

No industry better illustrates the natural location of wood-working establishments within the State of New York. Furniture calls for a great variety of woods of good quality. Most of the 32 species reported are obtainable locally and great possibilities exist for the further development of the industry throughout the State. The principal species, such as whie oak, birch, red oak, chestnut, sugar maple, basswood, beech, white pine, yellow poplar and hemlock are available in abundance.

White oak is the leading furniture wood. The wood is strong, hard, practically non-porous, with very large pith rays, giving a conspicuous "silver grain" when quarter-sawed. It is capable of taking a high polish and has all the other qualities desirable for furniture stock. Great care must be exercised to avoid checking in seasoning. The industry is so large and growing so rapidly that woodlot owners may expect very good prices in future for good furniture stock. The factories pay an average of $51.27 for the grade of white oak consumed. Its price exceeding all other native woods except red cedar and walnut. Its high average price is partly the result of much quarter-sawed stock coming from outside sources. Oak is largely used as exterior finish where beauty of grain and appearance count for much, being used in the form of veneer for table and desk tops, china cases, book cases, etc.

Red oak, although supplying the same high grade stock, is somewhat cheaper because it is purchased in larger proportion at home. It has the general qualities of white oak, being strong, heavy, hard, and, like white oak, is most beautiful when quarter-sawed. Red oak takes a high polish, but requires a filler on account of the open pores.

Birch is a splendid furniture wood and is comparatively cheap, the State of New York supplying over three-fourths of the 10,040,000 feet consumed. Its popularity over some other high grade woods, like red oak, is largely due to the fact that it can be made to resemble mahogany, at present one of the most stylish woods. Birch is its companion in furniture and fixture supplies. The mahogany is generally used in the form of very thin veneer and the 3,608,027 feet board measure consumed represents perhaps 60,000,000 feet or more of superficial measurements. Sugar maple, another wood largely homegrown, is a popular furniture wood. Its grain is fine and compact, sometimes containing curly or speckled pith flecks known as bird's eye maple. The wood has a beautiful, satin-like luster and when cut into veneers it is one of the most beautiful of our native species. It is especially attractive as bedroom furniture. Yellow poplar is used principally for backing and cores. Drawer bottoms and sides are made chiefly from basswood, red gum and yellow poplar, while drawer fronts use sugar maple, walnut, oak, birch and cherry. Seven foreign woods are reported. Circassian walnut, satinwood, rosewood, English oak and mahogany are used for exterior parts because of their beauty of grain and capability to take a high polish, being generally used in veneer form. Lignum-vitae, one of the densest and hardest of imported woods, is used along with sugar maple for the manufacture of castor wheels and other turnings, the small turned pieces being extremely tough and difficult to split. It is purchased in log form and costs $68 per M board feet in New York.

Furniture manufacturers generally consume rough lumber and for that reason the cost is rather high, $41 per thousand, being $10 higher than the average for all industries in the State. Furniture stock sometimes goes into the factory in dimension form and this adds to the expense of the raw material.

The most important local species contributing to this industry are white oak, birch, red oak, sugar maple, beech, basswood, chestnut and white pine, while red gum, mahogany, cypress and shortleaf pine contribute the largest amounts from distant timber areas. Hemlock is the cheapest native wood used in furniture in New York, while the more costly woods are white oak, black walnut and red cedar.

The kinds of furniture referred to in Table 6 include cabinets, bookcases, chests, bed frames, dressers, chiffoniers, couches, folding beds, davenports, mission furniture, Morris chairs, sewing table tops, desks, china cabinets, pilasters, toilet cabinets, buffets, file boards, tool chests, general bedroom furniture, sideboards, tables, table pedestals, wardrobes, tabourets, divans, cradles, stretchers, rockers and gun cabinets.

Furniture manufacturers were formerly very wasteful, but New York factories are now equipped with minor machines that utilize the smallest pieces of ebony, mahogany, oak, maple, birch, lignum-vitae and other woods for innumerable small articles such as book and towel racks, table feet, castor wheels, pedestals, fancy jewelry boxes, medicine

cabinets, cutlery boxes, foot stools, jardiniere stands, wall brackets, and other small but useful or decorative household articles, while the waste of many cheaper woods goes into dowels, glue blocks, drawer blocks, guide cleats, etc.

The furniture manufacturers of New York expend over $4,000,000 annually for the raw material going into their establishments, exclusive of the enormous amount paid for rough turned and semi-finished stock not shown in this table.

TABLE 6.— FURNITURE.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York feet b. m.
	Feet b. m.	Per cent				
White oak	32,413,100	31.03	$51 27	$1,661,908	6,047,950	26,365,150
Birch	10,040,382	9.61	26 34	264,446	7,937,932	2,102,450
Red oak	10,017,200	9.59	42 47	425,402	3,317,800	6,699,400
Chestnut	9,752,590	9.34	23 00	224,274	1,625,500	8,127,090
Sugar maple	8,351,900	8.00	28 62	238,909	5,117,400	3,234,500
Yellow poplar	6,056,780	5.80	38 76	234,773	477,500	5,579,280
Basswood	5,326,200	5.10	25 16	134,020	1,880,200	3,446,000
Beech	4,958,000	4.75	19 77	97,997	3,296,000	1,662,000
Red gum	3,666,825	3.51	31 06	113,888	.....	3,666,825
Mahogany	3,608,027	3.45	128 46	463,472	.....	3,608,027
White pine	2,153,000	2.06	31 26	67,300	1,190,500	962,500
Hemlock	1,570,000	1.50	14 11	22,150	55,000	1,515,000
Ash	1,423,625	1.36	27 20	38,716	959,325	464,300
Silver maple	1,335,500	1.28	32 32	43,166	399,000	936,500
Cypress (bald)	735,300	.70	31 95	23,492	.....	735,300
Shortleaf pine	603,000	.58	22 20	13,388	.....	603,000
Black walnut	558,501	.53	172 81	96,516	3,575	554,926
Butternut	500,000	.48	40 00	20,000	.....	500,000
Lignum-vitae	375,000	.36	68 00	25,500	.....	375,000
Elm	283,200	.27	25 16	7,126	175,200	108,000
Cherry (black)	245,550	.23	38 49	9,452	171,150	74,400
Red cedar	149,000	.14	60 62	9,033	.....	149,000
Circassian walnut	119,950	.11	304 41	36,514	.....	119,950
Loblolly	80,000	.08	21 00	1,680	.....	80,000
Spruce	47,500	.05	24 65	1,171	47,500	.....
Sycamore	28,012	.03	43 77	1,226	.....	28,012
English oak	20,000	.02	350 00	7,000	.....	20,000
Cucumber	16,000	.02	53 75	860	16,000	.....
Satinwood	8,450	.01	247 10	2,088	.....	8,450
Longleaf pine	4,000	*	45 00	180	.....	4,000
Hickory	3,500	*	30 57	107	.....	3,500
Rosewood	2,000	*	220 00	440	.....	2,000
Total	104,452,092	100.00	$41 04	$4,286,194	32,717,532	71,734,560

* Less than 1–100 of 1 per cent.

Car Construction.

Car construction is one of the most important wood using industries in the State. It ranks seventh in the general list of 47 industries reporting and consumes 76,201,900 feet of lumber and dimension stock. Several large railroads have important establishments and repair shops within the borders of the State. Shortleaf pine contributes almost one-third of the quantity consumed and it goes into flooring, lining, roofing, siding and framing of freight cars, along with white pine, red pine, loblolly pine and hemlock. Longleaf pine is used largely for car ceiling, decking and flooring. Its hardness and strength recommend it for such uses. The oaks are used largely for car frames, posts and locomotive woodwork. White oak is very important in high grade repair work where great strength is required. Some specifications demand oak only for the framework of pilots and oak only for passenger car draft timbers and sills, while either oak or ash must be used for car trucks. Either oak or hickory is demanded generally for end sills of tenders and bumper beams of locomotives, while white oak or hickory for car bearers, bolsters, posts and braces. Hickory only is used by one large company for brake beams and for jack levers, the species being pignut or shellbark. Red or Norway pine goes generally into car decking, while spruce is mainly used for running boards. White pine, in addition to general construction uses such as siding and framing, is used for tool boxes, templates and core boxes. Yellow poplar, one of the higher priced woods, is used along with mahogany, maple and the oaks for passenger car finish. The higher grade quarter-sawed oaks, showing such beautiful grain in interior finish, come from the central western States. Hard maple is used in considerable quantities for car platforms and levers. Douglas fir, like longleaf pine, is used for sills and beams where strength is required. Mahogany, supplemented by imitations from birch and other woods, is the principal finish of passenger cars. The average cost of all woods, $28.32, is lower than in most industries. Among the reasons why the cost of car stock is low, notwithstanding the fact that a good grade of material is demanded, are that the stock for car repairing need not be dressed and that the railroads can haul stock from distant States without paying heavy charges for transportation. The form of the raw material is generally rough planks but much of it is dimension stock for posts, sills, etc. The lengths, widths and thicknesses of the rough planks are generally cut to order. The standard lengths for car and dimension oak are 8, 9, 10, 12, 14 and 16 feet. Dimension sawed common oak plank and timbers used for car and building purposes must be free from wind shakes, dry rot, rotten knots or defects which impair the strength of the piece.

The total of over 76,000,000 feet ranks New York as one of the foremost States in the Union for the construction and repair of cars, being second only to Pennsylvania. While the State contributes but slightly over 3,000,000 of the raw material, there is a great possibility

of developing a splendid market at home. Railroad companies prefer to buy local stock whenever it is available and New York woodlot owners should endeavor to ascertain the form, grade and species desired by purchasing agents in their vicinity. Only a few of the 21 species needed by the railroads are necessarily purchased abroad and these are needed only in very small amounts for interior finish. The total expenditure of over $2,000,000 annually by the railroad companies for woods should attract the attention of our local lumbermen and bring about a greater consumption of home-grown materials. White oak contributes more than any other local species, while white pine, red oak, spruce and hemlock follow in the order named. Several other species such as ash, beech and yellow poplar should be more generally available in the State than is indicated by the reports of the railroads.

TABLE 7.—CAR CONSTRUCTION.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Shortleaf pine	24,554,800	32.22	$28 51	$700,146	.....	24,554,800
White oak	13,823,100	18.14	27 73	383,289	1,021,000	12,802,100
Longleaf pine	11,638,500	15.27	30 61	356,203	.....	11,638,500
Red oak	11,077,000	14.53	26 59	294,557	641,000	10,436,000
Norway pine	5,250,000	6.89	24 76	130,000	.....	5,250,000
Spruce	2,623,000	3.44	23 30	61,119	345,000	2,278,000
Loblolly	1,981,000	2.60	23 84	47,220	.....	1,981,000
Hemlock	1,560,000	2.05	19 38	30,240	315,000	1,245,000
White pine	1,164,500	1.53	33 66	39,197	726,000	438,500
Yellow poplar	896,800	1.18	57 52	51,584	10,000	886,800
Beech	457,000	.60	18 00	8,226	.....	457,000
Red gum	455,000	.60	18 00	8,190	.....	455,000
Ash	323,500	.42	59 98	19,402	10,500	313,000
Douglas fir	180,000	.24	48 00	8,640	.....	180,000
Mahogany	93,300	.12	123 12	11,487	.....	93,300
Cherry (black)	37,500	.05	84 45	3,167	.....	37,500
Sugar maple	30,200	.04	61 92	1,870	2,500	27,700
Hickory	28,000	.04	70 00	1,960	28,000	.....
Basswood	11,700	.02	49 40	578	3,700	8,000
Cypress (bald)	10,000	.01	40 00	400	.....	10,000
Birch	7,000	.01	61 43	430	1,000	6,000
Total	76,201,900	100.00	$28 32	2,157,905	3,103,700	73,098,200

MUSICAL INSTRUMENTS.

It is not generally known that New York is the leading State in the production of musical instruments, her consumption of wood for this purpose more than doubling that of her closest competitor, Massachusetts. The following comparison of leading States in the consumption of wood for musical instruments emphasizes the very important position held by this State.

	Feet.
New York	58,816,550
Massachusetts	27,463,412
New Jersey	15,582,316
Michigan	12,274,010
Connecticut	11,811,927
Kentucky	8,643,000
Ohio	8,583,000
Pennsylvania	2,945,000

All other States are insignificant compared with the ones named. While the factories of New York produce many kinds of instruments, such as accordions, banjos, drums, flutes, guitars, harps, mandolins, music boxes, and violins, the great bulk of wood consumed goes into piano and organ cases and action parts. New York City, Buffalo, North Tonawanda, Rochester, Syracuse and Utica, are among the important centers of piano and organ manufacturing.

The number of active plants in the State is very small compared with the number of firms engaged indirectly in the production of instruments. This is because one active plant, such as a large producer of action parts, will sometimes supply scores of firms with its output. Likewise, one large plant manufacturing piano cases will supply a large number of wholesale assemblers. The piano industry is specialized and the firms engaged in the business are either manufacturers of one part of the instrument such as an action part or case, while the great majority of wholesale firms are only assembling establishments. New York is also the headquarters for a large number of corporations that have active factories in other States and their consumption of wood is not included in this study.

Sugar maple is the leading species and contributes over one-sixth of the raw material, nearly one-half of which species is reported as home-grown. It is one of the high grade woods required by the industry, but its local abundance enables the factories to obtain it at cost of $35.28 per thousand, or $10 less than the average paid for all woods f. o. b. factory.

The industry consumes a great variety of woods, but the most of them are used to meet the various styles in cases. Such woods as maple, chestnut, white oak, mahogany, birch, walnut, cherry, satinwood, Circassian walnut and others are largely used in the form of veneer for outside finish and give a great variety of styles. Some woods, however, are used because of their special qualifications for certain parts. Spruce, for example, is one of the most resonant of woods, and its capability of transmitting sound makes it the most valuable wood for piano sounding boards, organ pipes, and ribbing on smaller instruments such as guitars and mandolins. Rosewood and other foreign woods in the form of veneer are important, supply-

ing much of the material used in guitars and mandolins. Sugar maple and yellow poplar strips are in great demand for banjo necks. White pine is not conspicuous here as in other industries, but a small amount is used for pipes of church organs and bottoms of piano keys. Red gum and sugar maple are especially suitable for action parts and a very large amount is used in this way. White ash, white oak and red oak, in addition to service for framework of larger instruments, are used for keyboards. Basswood is a favorite for keys, birch is used for keyrails and hammers, beech and elm for backs of pianos and organs and small instruments, while most of the yellow poplar, chestnut and redwood goes to make cores for the veneered parts of pianos and organs. Mahogany is prominent in the industry, contributing nearly 3,000,000 feet board measure. Its use is very general for veneering in all industries and this amount of lumber represents probably 60,000,000 feet, superficial measurement. One large importing establishment in New York reports a local consumption of 18,000,000 feet of mahogany logs. This enormous amount of mahogany is converted largely into standard veneer 1-24 to 1-28 of an inch thick, and much of it goes into the piano and furniture industries in the states of New York, New Jersey, Connecticut and Massachusetts.

Among the more striking features of Table 8 are the enormous amounts of raw material consumed, the great variety of woods used, and the relatively large proportion of homegrown woods used. Next to planing mill products and kindred general mill products comes furniture stock from our own woodlots and forests, but musical instruments follow furniture and consume over 21,000,000 feet of local raw material. The average price for the whole industry, $45.95 per thousand, is only exceeded by eight other industries in the State and is indicative of the high class of material demanded for musical instruments.

There is no great waste in the factories. While only the clear stock free from all defects can be used, most of the small ends and blocks can be utilized. Yellow poplar, maple, and gum waste generally can be turned into small parts for interiors of pianos, while the waste from the dimension stock of the high grade woods is used for ornaments, carvings, corners, moldings, etc. One large manufacturer of piano actions estimates a waste of 16 per cent, the waste consisting generally of pieces of red gum, 58 inches in length, from 1 to 6 inches wide and 1 inch thick. This wide stock is not usable in the piano industry on account of knots and holes; but most of this lumber is of good quality, first and seconds, and a better use than fuel should be found for it. The cost of assorting is the great obstacle to economically handling such waste for the production of some valuable by-product.

TABLE 8.—MUSICAL INSTRUMENTS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Sugar maple	10,445,900	17.76	$35 28	$368,576	4,871,300	5,574,600
Yellow poplar	9,933,300	16.89	48 86	485,355	1,011,200	8,922,100
Spruce	9,557,950	16.25	24 27	232,004	8,865,700	692,250
Red gum	4,100,200	6.97	38 42	157,523	.....	4,100,200
Chestnut	3,596,000	6.11	23 42	84,236	124,000	3,472,000
Basswood	3,513,600	5.97	37 64	132,250	1,328,600	2,185,000
White oak	3,481,500	5.92	62 79	218,605	504,250	2,977,250
Mahogany	2,934,200	4.99	149 58	438,908	.....	2,934,200
Birch	2,791,500	4.75	30 19	84,276	2,036,500	755,000
Red oak	2,168,000	3.69	63 58	137,850	401,250	1,766,750
Silver maple	1,393,900	2.37	29 83	41,580	548,900	845,000
White pine	1,251,500	2.13	53 39	66,815	416,300	835,200
Elm	1,090,000	1.85	36 66	39,954	415,000	675,000
Black walnut	698,600	1.19	111 76	78,073	26,100	672,500
Beech	617,000	1.05	29 83	18,406	317,000	300,000
Ash	517,200	.88	67 09	34,701	94,700	422,500
Circassian walnut	221,750	.38	251 41	55,750	.....	221,750
Sugar pine	150,000	.25	79 00	11,850	.....	150,000
Cherry (black)	120,000	.20	45 13	5,416	109,000	11,000
Redwood	65,000	.11	56 15	3,650	.....	65,000
Cottonwood	59,000	.10	24 24	1,430	.....	59,000
Butternut	45,000	.08	35 29	1,588	12,000	33,000
Hemlock	26,000	.04	24 00	624	.....	26,000
Douglas fir	10,000	.02	65 00	650	.....	10,000
Buckeye	6,000	.01	25 00	150	.....	6,000
Longleaf pine	5,000	.01	45 00	225	.....	5,000
Red cedar	5,000	.01	160 00	800	.....	5,000
Satinwood	5,000	.01	250 00	1,250	.....	5,000
Cypress (bald)	2,500	*	48 00	120	.....	2,500
Spanish cedar	2,000	*	250 00	500	.....	2,000
Sitka spruce	2,000	*	100 00	200	.....	2,000
Holly	1,000	*	100 00	100	.....	1,000
Rosewood	950	*	298 00	283	.....	950
Total	58,816,550	100.00	$45 97	2,703,698	21,081,800	37,734,750

* Less than 1/100 of 1 per cent.

DAIRYMEN'S, POULTERERS' AND APIARISTS' SUPPLIES.

Table 9 includes beehives, brooders, butter ladles, butter moulds, cattle stanchions, cheese boxes, chicken coops, cream separators, incubators and portable poultry houses. The production of cheese-boxes consumes almost every species enumerated in the table. The consumption of home-grown wood equals 25 per cent of the 39,045,000 feet reported and nearly all of the species are found in the State, the exceptions being longleaf pine, redwood, western white pine, shortleaf pine and cypress. These imported woods are especially useful for certain articles, cypress and redwood, for instance, being particularly suited for incubators. Strange to say, chestnut is not generally used throughout the counties in this industry, although it contributes

over 50 per cent of the wood reported. Its importance, from the standpoint of quantity consumed, is accounted for by the fact that two or three large firms use it in the construction of incubators of the larger dimensions and it is used for tops, ceilings, partitions, mouldings, skirt boards, legs and body rails. Where one firm reports the use of chestnut, fifty firms will report a great variety of woods without mentioning chestnut.

For cheese boxes almost any wood can be used, either for headings, hoops, or staves, and the same is true of cattle stanchions, but the other products require wood of certain species. Beehives use white pine very generally for the outer boxes, while basswood is preferred for honey boxes. Butter boxes are generally made of either spruce, yellow birch, hard maple or oak; and butter tubs are largely made of basswood, ash, white oak, red oak, spruce and hemlock. Ice cream freezers depend largely upon cedar. Cypress is demanded for tanks, tubs, well buckets and other articles coming in contact with water. Elm is one of the more important woods for this class of products, contributing nearly two millions of feet, most of which is used in the form of hoops and sides for cheese boxes, but a small amount for veneer for cheese box siding. The average cost of the raw material for Table 9 is $28.05, which is very low and accounted for by the fact that the industry consumes much material in the form of logs, the manufacturing consisting principally of simple reduction of billets and bolts into staves and heading suitable for local industries.

TABLE 9.—DAIRYMEN'S, POULTERERS', AND APIARISTS' SUPPLIES.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Chestnut	20,388,100	52.22	$31 66	$645,421	500,000	19,988,100
Basswood	6,104,000	15.63	22 53	137,521	4,082,000	2,022,000
White pine	4,653,300	11.92	25 68	119,515	686,300	3,967,000
Elm	1,843,600	4.72	20 28	37,391	1,450,000	393,600
Yellow poplar	1,725,200	4.42	29 89	51,558	125,000	1,600,200
Spruce	1,057,000	2.71	22 95	24,262	907,000	150,000
Beech	663,600	1.70	19 12	12,691	539,600	124,000
Silver maple	390,500	1.00	21 72	8,480	372,500	18,000
Sugar maple	347,200	.89	27 87	9,676	200,200	147,000
Ash	293,000	.75	17 90	5,245	258,000	35,000
Cypress, bald	280,000	.72	44 79	12,540	.....	280,000
Arborvitae (northern white cedar)	250,000	.64	34 00	8,500	.....	250,000
Hemlock	172,000	.44	18 62	3,203	170,000	2,000
Loblolly pine	160,000	.41	21 00	3,360	.....	160,000
Shortleaf pine	152,000	.39	24 98	3,797	.....	152,000
White oak	100,500	.26	30 47	3,062	80,500	20,000
Cucumber	100,000	.26	15 00	1,500	100,000	.....
Western white pine	100,000	.26	20 00	2,000	.....	100,000
Red oak	70,000	.18	27 50	1,925	70,000	.....
Aspen	40,000	.10	12 00	480	40,000	.....
Cottonwood	40,000	.10	18 88	755	40,000	.....
Pitch pine	35,000	.09	12 74	446	.....	35,000
Birch	26,000	.06	18 00	468	26,000	.....
Redwood	20,000	.05	30 00	600	.....	20,000
Balsam fir	14,000	.03	19 71	276	14,000	.....
Longleaf pine	12,000	.03	42 00	504	.....	12,000
Butternut	5,000	.01	18 00	90	5,000	.....
Willow	3,000	.01	17 00	51	.....	3,000
Total	39,045,000	100.00	$28 05	1,095,317	9,666,100	29,378,900

SHIP AND BOAT BUILDING.

Ship and boat building is another important wood-using industry in the State, the consumption of nearly thirty-eight million feet for this purpose placing this branch of trade number eight from the top when considered in the standpoint of quantity of wood consumed annually. To show the relative importance of the State in this industry it is necessary to compare this consumption with that in a number of the leading boat and ship building States. Such a comparison shows definitely that New York is the leader among the shipbuilding States. With the great Brooklyn Navy Yard producing the largest of battleships; the Hudson and other large rivers and lakes supplying water transportation for passenger and freight from border to border, such craft ranging in size from the most palatial passenger steamers plying between New York and Albany and from Buffalo westward on the Great Lakes, to the innumerable and ex-

pensive private yachts harbored within every lake and stream of the State; with the Erie canal carrying her heavy burdens of coal, iron and agricultural produce, it is not strange that ship and boat building in this State should far excel the combined production of a number of other important States. Her position is shown in the following comparison:

	Feet B. M.
New York	37,700,500
Pennsylvania	26,716,000
New Jersey	13,341,796
Virginia	11,138,497
Maine	10,299,400
Delaware	7,867,136

In the matter of real shipbuilding Pennsylvania is not to be seriously compared because the major portion of her boat output consists only of rough barges for use on the Ohio river, where the transportation of coal is important.

In Table 10 longleaf pine leads, contributing over 50 per cent of the raw material used in the industry. This wood goes largely into ships, its availability in large structural sizes, its strength and hardness recommending it above homegrown woods. Douglas fir comes entirely across the continent to supply ships with spars, while mahogany, teak, Circassian walnut, lignum-vitae and balsa (cork) wood are imported from foreign countries, the balsa being important in the equipment of boats with life preservers. The foreign woods are generally used for decorative parts of ships and yachts, but not always so. Lignum-vitae, for example, is used for steering wheels, tackleblock wheels and pulleys. For small craft such as rowboats the southern white cedar is considered the finest of woods, because it is light, can be struck without serious indentation, resists decay in contact with water and finishes well. Its capacity to resist serious deformation when bumped is important. It is claimed that a very thin shaving of white cedar can be folded and struck with a hammer on an anvil and that it will be injured less than a folded piece of cotton cloth subjected to the same test.

Ship and boat building is an industry in which substitution has been going on steadily. In larger vessels steel and iron have taken the place of wood to a great extent. For pleasure boats of less than eighty feet in length, however, wood is preferred. Steel vessels vibrate so badly that they are decidedly inferior for passenger service.

The fact that thirty-eight species are shown in Table 10 is evidence of the varied kinds of water craft produced in New York. Only one-seventh of the raw material is homegrown, but this is partly accounted for by the location of the leading plants along New York harbor where shipments by water are very economical from South Atlantic ports.

TABLE 10.— SHIP AND BOAT BUILDING.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Longleaf pine	19,354,500	51.34	$33 97	$657,383	.....	19,354,500
White oak	6,313,500	16.75	48 70	307,495	2,005,000	4,308,500
White pine	2,815,700	7.47	57 75	162,593	1,375,200	1,440,500
Spruce	1,877,397	4.98	36 04	67,669	480,000	1,397,397
Shortleaf pine	1,626,300	4.31	29 50	47,980	.....	1,626,300
Red oak	1,280,400	3.40	45 76	58,596	272,900	1,007,500
Douglas fir	565,000	1.50	56 17	31,737	.....	565,000
Sugar maple	422,500	1.12	36 33	15,351	347,500	75,000
Cypress (bald)	380,800	1.01	50 91	19,385	.....	380,800
Western white pine	300,000	.80	53 33	16,000	.....	300,000
Red cedar	277,500	.74	54 68	15,175	.....	277,500
Ash	270,000	.72	59 33	16,020	115,000	155,000
Southern white cedar	230,000	.61	58 06	13,354	.....	230,000
Mahogany	225,400	.60	160 10	36,087	.....	225,400
Western yellow pine	200,000	.53	27 50	5,500	.....	200,000
Arborvitae (northern white cedar)	177,600	.47	52 08	9,249	79,700	97,900
Basswood	156,000	.41	25 18	3,928	121,000	35,000
Birch	135,000	.36	33 33	4,500	22,500	112,500
Locust	127,028	.34	51 37	6,525	63,400	63,628
Western red cedar	119,000	.31	49 75	5,920	.....	119,000
Chestnut	105,800	.28	36 40	3,851	55,300	50,500
Red gum	100,000	.26	30 00	3,000	25,000	75,000
Yellow poplar	97,000	.26	45 88	4,450	.....	97,000
Cherry (black)	89,200	.24	68 09	6,074	53,900	35,300
Loblolly pine	75,000	.20	22 00	1,650	.....	75,000
Teak	74,000	.20	241 49	17,870	.....	74,000
Beech	65,000	.17	25 00	1,625	65,000	.....
Elm	50,600	.13	23 50	1,189	50,600	.....
Hemlock	46,000	.12	26 52	1,220	46,000	.....
Hickory	45,000	.12	43 89	1,975	10,000	35,000
Western hemlock	30,275	.08	75 54	2,287	.....	30,275
Circassian walnut	25,000	.07	200 00	5,000	.....	25,000
Balsawood (corkwood)	20,000	.05	40 00	800	.....	20,000
Butternut	11,000	.03	67 73	745	1,000	10,000
Norway pine	5,000	.01	25 00	125	.....	5,000
Silver maple	5,000	.01	28 00	140	5,000	.....
Lignum-vitae	2,000	*	275 00	550	.....	2,000
Willow	1,000	*	10 00	10	1,000	.....
Total	37,700,500	100.00	$41 19	$1,553,008	5,195,000	2,505,500

* Less than 1/100 of 1 per cent.

VEHICLES AND VEHICLE PARTS.

This industry ranks tenth in output among the State's industries, consuming a total of 30,633,100 feet and paying at the average cost of $43.95 per thousand. As a general rule high grade material is demanded. Clear stock of the best species of hardwood are in great demand. It is noticeable that State woodlots supply considerably over 50 per cent of the raw material demanded, while the first ten species, in the order of their importance, are found in great abundance

Photo by Hugh P. Baker.

RESULTS OF LOGGING IN THE NORTHERN APPALACHIAN SECTION.

The skidways show methods of lumbering and in the foreground the results of fire following logging can be seen. There are hundreds of thousands of acres of such land in Pennsylvania and New York which through the practice of Forestry can be made to produce better forests than covered the section as virgin forest.

at home. Hickory, naturally, leads all species. It is perhaps the most nearly indispensable wood in the United States and none is known anywhere that will satisfactorily take its place for slender handles and certain parts of vehicles. Its scarcity is attracting national attention among wood users. The National Hickory Association has made a serious study of the problems of utilization and marketing of hickory for the purpose of avoiding extreme waste and gross misuse of hickory. Other woods should be substituted wherever possible and thus reserve the present hickory supply for the production of such articles as depend entirely upon hickory. Many parts of vehicles depend entirely upon hickory. Among its important uses are the following: automobile spokes, ax handles, buggy poles, cross-bars, doubletrees, tool handles, neck yokes, rims, shafts, singletrees, wagon gear (reaches), and small vehicle spokes. Light buggies must have slender hickory spokes where great strength must be combined with slenderness. It is very strong, very heavy, very hard and very stiff and is capable of withstanding the severest thrust or twist. White oak and ash follow closely in importance in the industry and are used in many places where hickory is used except that they are used in larger dimension stock where resiliency and slenderness are not so important. Wagon hounds, felloes, bolsters and poles are favorite uses for oak and ash. Yellow poplar is used along with several other woods for wagon boxes and it is a favorite wood for automobile bodies, dividing honors with ash. Vehicles drawn by horses consume the major portion of the raw material, but automobile stock, warehouse trucks, push carts, sleds, wheelbarrows and small wagons are included in the industry.

The form of the raw material required for all branches of this industry varies so greatly that details cannot be given. A few specifications will give a general idea of certain grades and dimensions required and which should be supplied by local woodlots.

Article.	Dimensions required.
Wagon axles...	Squares 2¾″x3¾″ to 6″x7″ and 6′ long.
Wagon bolsters.	Squares 3″ x 4″ to 4″ x 6″ and in lengths 4′ 1″ to 4′ 6″.
Wagon reaches.	Squares 2″ x 4″ to 2½″ x 5″ and in lengths 8′ 10″ to 14′.
Wagon poles...	Squares 2½″ x 4″ tops to 4″ x 4″ butts and 12′ long to 3¼″ x 3¼″ tops to 3¼″ x 5″ butts and 12′ long.
Wagon eveners.	Squares 2″ x 4″ to 2½″ x 5″ and in length 4′ 2″ x 4′ 6″.
Single trees....	Squares for turning to be 2½″ x 3″ and 36″ long.
Neck yokes.....	Squares for turning to be 4″ x 4″ and 44″ to 48″ long.

Article.	Dimensions required.
Felloes.....	Squares for sawing may be made from short, clear cuttings 10" to 14" wide and from 24" to 30" long.
Hub stock.....	In the round for turning. Blocks to be 9½" to 12" in diameter inside of bark and 12" to 15½" long.
Spokes.....	Squares for turning to be approximately 2" x 2½" and 30" in length.
Boxboards.....	9" to 17" in width and 12' to 16' in length.

The general wagon industry includes all business and pleasure vehicles from the light delivery wagon of the bakery to the heavy trucks employed in hauling stone and timber. Much of the heavy turned stock comes from the central southern States in a partly finished condition to be used for spokes, rims, shafts and tongues. In Arkansas and other central southern States many factories specialize in vehicle stock and shipments are made in some instances ready for the assembler and the shipper practically completes the work. New York wood users are not given credit for the consumption of all material purchased because much hickory and oak stock goes north to New York in practically finished form. The magnitude of the general vehicle industry in New York is not readily realized by a study of the amount of wood consumed. The assembling business is very large in the State, while the production of metal parts is of still greater importance. Much substitution has gone on in this line of work, especially in the production of lighter buggies and automobile bodies. Many automobiles have almost no wood in their makeup. One large manufacturer reports that he has reduced the amount of wood used to nine board feet and this small amount consists of mahogany, birch, maple and black walnut trimmings. Some machines have mahogany dash boards. Yellow poplar in the form of veneer is growing in popularity against metal for automobile bodies in many establishments and it looks as if the consumption of wood in the automobile line will increase rather than decrease from now forward. White oak, hickory and ash are essential in the running gear, automobile spokes, etc.

The consumption of over 30,000,000 feet of wood annually for the manufacture of vehicles places New York among the leading States in this industry. A few States, including Illinois, consume a greater amount of raw material, but very few States contribute as much as New York does from home woodlots. Eleven million feet taken from local citizens throughout the counties is an important item in the lumbering interests among the timber owners of New York.

Thirty-two species contribute to the industry and New York has an abundance of all the species that are most needed. The State contributes over 2,000,000 feet of ash, nearly 2,000,000 feet of hickory and over 1,000,000 feet of sugar maple. Basswood, birch, beech, elm,

chestnut and spruce are available at the doors of nearly all of the manufacturing establishments at prices ranging between $16.77 for chestnut to $37.63 per M. for birch. Mahogany is the highest priced wood, at $138.74, while black walnut at $87.45, Douglas fir at $70 and yellow poplar at $62.90 per M. feet are the next most expensive. The average price of all woods is $43.95 per M.

TABLE II.— VEHICLES AND VEHICLE PARTS.

KIND OF WOOD	Quantity Used Annually		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York,	Grown out of New York,
	Feet b. m.	Per cent			feet b. m.	feet b. m.
Hickory	6,874,350	22.44	$44 00	$302,450	1,429,250	5,445,100
White oak	5,134,750	16.76	48 47	248,884	1,959,050	3,175,700
Ash	5,128,000	16.74	45 53	233,471	2,151,500	2,976,500
Yellow poplar	2,701,900	8.82	62 90	169,961	488,600	2,213,300
Red oak	2,586,200	8.44	48 07	124,312	696,200	1,890,000
Sugar maple	1,984,400	6.48	31 61	62,722	1,085,900	898,500
Basswood	1,622,450	5.30	31 67	51,391	957,150	665,300
Birch	1,455,000	4.75	37 63	54,757	696,700	758,300
Beech	718,000	2.34	18 94	13,601	668,000	50,000
Elm	441,950	1.44	25 39	11,221	285,150	156,800
Longleaf pine	419,300	1.37	35 43	14,854	.....	419,300
Chestnut	271,200	.89	16 67	4,520	270,200	1,000
Shortleaf pine	253,500	.83	24 62	6,240	.....	253,500
Spruce	253,000	.83	29 07	7,355	220,000	33,000
White pine	181,100	.59	40 60	7,353	77,600	103,500
Cottonwood	136,000	.44	28 24	3,840	13,000	123,000
Mahogany	90,500	.29	138 74	12,556	.....	90,500
Douglas fir	87,500	.28	70 00	6,125	.....	87,500
Silver maple	80,000	.26	26 00	2,080	80,000	.....
Loblolly pine	60,000	.20	33 50	2,010	.....	60,000
Cypress (bald)	37,000	.12	55 27	2,045	.....	37,000
Hemlock	24,000	.08	26 33	632	24,000	.....
Walnut (black)	23,100	.07	87 45	2,020	100	23,000
Western white pine	23,000	.07	37 00	851	.....	23,000
Cotton gum	15,000	.05	22 00	330	.....	15,000
Pitch pine	15,000	.05	20 00	300	15,000	.....
Cherry (black)	5,900	.02	42 54	251	2,900	3,000
Red pine	5,000	.02	18 00	90	.....	5,000
Red cedar	2,000	.01	25 00	50	.....	2,000
Sycamore	2,000	.01	35 00	70	.....	2,000
Applewood	1,000	*	20 00	20	1,000	.....
Butternut	1,000	*	18 00	18	1,000	.....
Total	30,633,100	100.00	$43 95	$1,346,380	11,122,300	19,510,800

* Less than 1/100 of 1 per cent.

AGRICULTURAL IMPLEMENTS.

New York is prominent in the manufacture of agricultural implements. The factories cover a broad field of activity, producing general agricultural implements, such as threshers, binders, corn cutters, cultivators, drills, ensilage cutters, grain cradles, harrows, harvesters,

hay loaders, hay racks, hay teddors, hay presses, hoppers, lawn mowers, planters, plows, spreaders, windmills, etc. This industry is closely related with handles and vehicles in that most of the material going into the agricultural implement stock consists of vehicle poles, singletrees, whiffletrees or handles for articles such as plows and hand mowers. The body of many of the articles consists entirely of metal, especially the soil working machines like harrows, plows, cultivators and drills, while only the conveying or vehicle parts consist of wood. The manufacture of agricultural implements in the State is extremely important, the amount of wood consumed being only a small proportion of the raw material used in the production of the finished article. The total consumption amounts to 28,055,600 feet annually and the average price paid by the industries is $31.29 per thousand feet. Most of the raw material is home-grown and the various establishments of the industries are so generally distributed over the State that woodlot owners are in a position to supply the needs of factories at their doors without heavy transportation charges.

Sugar maple is consumed in larger quantities than any other wood and is used largely for singletrees, neck yokes, eveners, drill frames, lawn-mower handles, drill boxes and seed boxes of general agricultural implements. Its hardness recommends it also for ensilage cutter frames and cutter blocks. Most of the sugar maple used in the industry is homegrown. Longleaf pine is imported in large quantities for use as implement poles, where its strength combined with moderate weight recommends it above heavier woods such as oak. The greater strength of oak is not essential for poles in much of the farm work of to-day, while the light weight of pines gives it a decided advantage over the oaks for certain uses. Red gum is imported in large quantities and finds use mainly as box material in threshing machines and other smaller articles. White and red oak are needed for the framework of articles such as hay presses and hay racks and as beams for handles. Ash takes its place in the handle parts of cultivators and along with oak in plow beams, plow handles and tanks of the heavier farm machinery. Many of the woods like shortleaf pine, spruce, basswood, beech, white pine, hemlock and yellow poplar have no special qualifications for a particular use in the industry, but are used indiscriminately for all kinds of framework. Hickory is used for maul and hay fork handles and for repair work of vehicles, especially the replacing of spokes. A small amount is used for rods connected with threshing machines, where extreme toughness and capacity to resist shock are essential properties. A small amount of bald cypress is imported into the State and is used principally for tanks in the threshing line. Elm is used chiefly for hay racks and ensilage cutter frames. Hickory is the highest priced wood consumed in the industry, but its cost of $41.70 per thousand is followed closely by the oaks at $41.02. Silver maple is cheapest, at $19.44 per thousand.

TABLE 12.—AGRICULTURAL IMPLEMENTS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Sugar maple	7,970,750	28.41	$28 84	$229,860	2,699,500	5,271,250
Longleaf pine	3,371,200	12.02	36 97	124,636	.....	3,371,200
Shortleaf pine	2,911,000	10.38	37 96	110,503	.....	2,911,000
Spruce	2,279,500	8.12	20 80	47,417	141,000	2,138,500
Red gum	1,542,000	5.50	26 19	40,386	.....	1,542,000
White oak	1,539,000	5.48	41 02	63,135	1,052,000	487,000
Basswood	1,367,000	4.87	28 60	39,097	1,127,000	240,000
Beech	1,322,000	4.71	25 33	33,490	1,322,000	.....
Ash	1,118,200	3.99	34 76	38,873	671,200	447,000
Elm	833,000	2.97	27 72	23,090	427,000	406,000
White pine	782,000	2.79	31 56	24,677	611,000	171,000
Yellow poplar	673,700	2.40	37 87	25,516	50,500	623,200
Red oak	655,500	2.34	41 02	26,886	494,500	161,000
Birch	390,000	1.39	30 82	12,021	380,000	10,000
Hemlock	328,500	1.17	20 26	6,655	328,500	.....
Hickory	315,000	1.12	41 70	13,136	39,000	276,000
Cottonwood	255,000	.91	23 67	6,036	.....	255,000
Cypress (bald)	168,000	.60	39 19	6,584	.....	168,000
Chestnut	133,000	.47	23 38	3,110	74,000	59,000
Red pine	40,000	.14	32 00	1,280	.....	40,000
Loblolly	30,000	.11	28 00	840	.....	30,000
Silver maple	23,250	.08	19 44	452	19,000	4,250
Butternut	8,000	.03	30 00	240	8,000	.....
Total	28,055,600	100.00	$31 29	$877,920	9,444,200	18,611,400

BOOT AND SHOE FINDINGS.

Boot and shoe findings include principally lasts, last blocks, shoe forms, shoe trees and pegs. Sugar maple is the principal last stock for all factories and contributes over 90 per cent. of the 22,882,000 feet. The list of last woods includes persimmon and beech, but these woods are not important in the industry. Basswood is used occasionally for lasts, generally as a filler in the blocks and for hollow forms. Sugar maple so admirably meets the requirements of the last industry that comparatively little other wood is used. Although the industry requires high grade wood, the low average cost of $25.04 per thousand is possible because all the woods used are homegrown except persimmon which is brought from Arkansas, Tennessee and other states. Another reason for the low average cost of the raw material is the use of bolts or logs at the factory instead of rough turned last blocks. Much of the raw material is obtained in the bolt form at $12.50 per thousand. The consumption of wood for the manufacture of lasts is greater in New York than in any other State; practically all of this wood is sugar maple. Michigan ranks second in the consumption of sugar maple for lasts, consuming 14,350,000 feet annually as against New York's consumption of 21,196,000 feet. Maple is preferred

because it is hard, smooth-grained, tough, capable of high polish, does not warp or shrink, holds metal clamps well and resists the severe wear to which it is subjected. The fact that New York's woodlots and forests contribute over 85 per cent. of the 21,000,000 feet of maple consumed in the manufacture of lasts is evidence of the natural economic location of these factories. The industry is growing and will need all the bolts and rough dimension blocks available from our local woodlots.

TABLE 13 — BOOT AND SHOE FINDINGS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Sugar maple	21,196,000	92.63	$24 15	$511,806	18,096,000	3,100,000
Basswood	1,241,000	5.42	36 46	45,241	1,094,000	147,000
Silver maple	150,000	.66	12 50	1,875	150,000	.....
Persimmon	94,000	.41	98 60	9,268	.....	94,000
Birch	91,000	.40	28 16	2,563	91,000	.....
Beech	60,000	.26	16 00	960	60,000	.....
Black cherry	25,000	.11	30 00	750	25,000	.....
Hickory	25,000	.11	20 00	500	25,000	.....
Total	22,882,000	100.00	$25 04	$572,963	19,541,000	3,341,000

CHAIRS.

Table 14 accounts for 21,612,200 feet of raw material consumed by this wood-using industry. This industry is really a part of the furniture industry but many factories make a specialty of chairs and it is possible to fairly well distinguish these plants from general furniture establishments. Hardwoods contribute over 98 per cent. of the woods going into chairs. The seats and backs are generally of veneer and manufactured as a separate commodity by some factories. The veneer is cut thin, the articles generally perforated and usually three sheets are glued together. This built-up stock of three-ply chair seats and backs, having the grain of the middle sheet running at right angles to the outer sheet, is much stronger than the solid block of the same thickness. New York turns out all kinds of chairs, from the cheapest camp chair to the finest office and lodge furniture and a great range of cost is shown in the raw material consumed. Mahogany leads all woods in cost, while beech at the low average price of $18.98 per thousand, f. o. b. factory is the cheapest. The average of $38.43 per thousand for the whole industry is reasonable for the good stock required. Its reasonable price is due to the special dimension stock cut out by mills. Other classes of furniture change so much in styles and forms that it is impossible to conduct a factory on an economic

basis of production. The chair industry is not wasteful, the plants being able to utilize very small pieces. This is another industry in which the home-grown material predominates, the 11,997,300 feet consumed annually being an important item in the shipments from the woodlots of the State of New York.

TABLE 14.— CHAIRS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
White oak	6,897,100	31.91	$45 40	$313,126	3,139,000	3,758,100
Red oak	4,080,500	18.88	39 69	161,935	1,608,000	2,472,500
Birch	2,889,500	13.37	31 02	89,624	2,730,500	159,000
Sugar maple	2,639,300	12.21	23 86	62,982	1,877,800	761,500
Beech	1,467,500	6.79	18 98	27,853	1,354,500	113,000
Silver maple	1,077,000	4.98	27 16	29,254	477,000	600,000
Mahogany	844,900	3.91	121 18	102,388	.....	844,900
Chestnut	486,500	2.25	20 76	10,099	204,500	282,000
Basswood	418,000	1.94	23 91	9,994	260,000	158,000
Elm	333,500	1.54	27 68	9,231	123,000	210,500
Ash	154,000	.71	26 53	4,085	117,000	37,000
Red gum	134,500	.62	28 62	3,850	.....	134,500
Yellow poplar	65,000	.30	27 28	1,773	.....	65,000
Hickory	51,200	.24	31 17	1,596	50,000	1,200
White pine	35,000	.16	30 71	1,075	35,000	.....
Red Cedar	17,500	.08	58 00	1,015	.....	17,500
Cherry (black)	16,000	.08	35 25	564	16,000	.....
Black walnut	5,200	.03	42 12	219	5,000	200
Total	21,612,200	100.00	$38 43	$830,663	11,997,300	9,614,900

FIXTURES.

The manufacturers of fixtures consume twenty-six kinds of wood, using 20,175,615 feet and paying therefor the handsome average price of $49.37 per thousand feet f. o. b. factory. The industry is closely allied to those of furniture and interior house finish. The products referred to in Table 15 include articles that are at least temporarily fixed to the interior part of the house and not readily movable like furniture. Fixtures herein tabulated include equipments of banks, offices, saloons, stores, lodgerooms, and churches and consist of altars, counters, bar tops, drug cabinets, pews and pulpits, shelving, show cases, blackboards, billiard racks, wall cases, special telephone booths, window seats, specially made desks, tables and racks, glass-and-sash partitions, and other articles made to order for a particular room and not to be used elsewhere. The fixtures occupy a middle place between furniture and interior finish. The latter, when put in place, is permanent and becomes part of the building; fixtures may be moved with more or less remodeling. Still another industry, "general millwork"

overlaps "fixtures," because many woodworking establishments have included special orders for cheap fixtures in their reports of annual consumption for "general millwork."

White oak leads all other species in quantity and is one of the most expensive woods, its average cost of $60.75 per thousand being only below the cost of such imported woods as mahogany, Circassian walnut, rosewood and vermillion. Chestnut, at $25.84 per thousand is the cheapest wood. It is used along with many other cheaper woods for interior frames, shelving, cores for veneer panels, forming the middle sheets upon which high grade veneer woods are glued. It is also used for blackboards, mission fixtures and telephone booths. Yellow poplar occupies second place and its workableness and smooth, even grain and texture recommend it for backing, shelving, drawers, counters and interior parts of bar and store fixtures.

Fixtures consume many of the high-grade woods in the form of veneer, the broad panels of show cases and tops of many articles calling for veneers from white oak, red oak, black cherry, mahogany, red gum, black walnut, Circassian walnut and rosewood for use as outside finish. Sugar maple is the third most important wood in the industry and is used in every way for the exterior parts of store and office fixtures, but by far the larger items are reported for the production of church and school furniture. Birch and cherry are used largely for cabinet work in connection with wall fixtures, but a considerable amount goes into solid parts in imitation of mahogany. Red gum occupies the same position, in imitation of Circassian walnut. Bar tops call for the heavier lumber and require species that are hard, smooth-grained, and capable of taking a high finish, the most popular woods being mahogany, oak, birch, walnut and cherry.

Mahogany, rosewood and Circassian walnut are the only woods imported in considerable quantities from foreign countries for use in this industry.

Much of the Circassian walnut used in New York comes from the shores of the Black Sea. Its high price of over $200 per thousand feet limits its use to the very finest fixture, furniture and cabinet work. The wood weighs almost forty-five pounds per cubic foot, is hard, compact, easy to work and split, moderately tough, durable, shrinks little in seasoning and does not warp or crack. Burled and other highly figured forms of the wood take a beautiful polish.

There are about seventy-five establishments in the State that specialize in the manufacture of fixtures and the industry is an important user of several home-grown species, including white oak, red oak, chestnut, birch and white pine. Substitution has been general in the industry, the combination of metal strips and glass for showcases having become most extensive. The growth of the fixture industry has been enormous, but the utilization of wood has not increased as rapidly as the industry in general.

TABLE 15.— FIXTURES.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	cent				
White oak	4,470,000	22.16	$60 75	$271,563	1,990,500	2,479,500
Yellow poplar	3,023,250	14.98	43 27	130,817	233,000	2,790,250
Sugar maple	2,215,000	10.98	28 19	62,440	112,000	2,103,000
Red oak	1,808,500	9.41	44 57	84,615	695,000	1,203,500
Chestnut	1,828,100	9.06	25 84	47,245	1,275,800	552,300
Cherry (black)	1,150,000	5.70	47 43	54,550	55,000	1,095,000
Mahogany	1,056,800	5.24	138 56	146,428	.....	1,056,800
Birch	1,055,500	5.23	46 61	49,195	537,500	518,000
Elm	723,000	3.58	36 78	26,590	23,000	700,000
White pine	704,400	3.49	43 95	30,956	521,400	183,000
Loblolly	470,000	2.33	26 97	12,675	.....	470,000
Shortleaf pine	332,000	1.65	32 12	10,665	.....	332,000
Basswood	201,000	1.00	36 42	7,321	76,000	125,000
Red gum	168,200	.83	47 78	8,036	.....	168,200
Ash	164,050	.81	45 55	7,473	114,050	50,000
Cypress (bald)	163,500	.81	38 36	6,272	.....	163,500
Spruce	141,000	.70	31 52	4,445	40,700	100,300
Cottonwood	110,000	.55	31 27	3,440	75,000	35,000
Black walnut	71,500	.35	90 91	6,500	.....	71,500
Beech	65,000	.32	27 00	1,755	.....	65,000
Circassian walnut	53,500	.27	207 66	11,110	.....	53,500
Butternut	50,000	.25	45 00	2,250	.....	50,000
Rosewood	29,340	.15	256 61	7,529	.....	29,340
Longleaf pine	28,100	.14	43 45	1,221	.....	28,100
Vermillion	3,000	.01	300 00	900	.....	3,000
Red cedar	875	*	110 00	96	.....	875
Total	20,175,615	100.00	$49 37	$996,087	5,748,950	14,426,665

* Less than 1/100 of 1 per cent.

PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.

This industry consumes nearly 20,000,000 feet, at an average cost of $37.91 per thousand feet f. o. b. factory. Table 17 refers to such articles as are used by artists, mechanics, professional and scientific men, among them being cameras, drawing boards, blackboards, erasers, geometrical blocks, gauges, calculating machines, mallets, map globes, mathematical instruments, mitre boxes, pencils, palettes, pen holders, pointers, surveyor rods, rulers, measuring scales, spirit levels, surveyor sticks, T-squares, thermometers, tripods, etc.

Red cedar contributes approximately three-fourths of the wood consumed by the industry and costs $37.55 per thousand feet. This might seem rather odd because red cedar is not suitable for most of the articles reported. Its use, however, is found in the production of lead pencils and several establishments consume enormous quantities in the manufacture of this article. The southern red cedar (*Juniperus virginiana*) is the only wood that meets all the requirements of the best

lead pencil. Its commercial range extends from the Ohio River on the north as far east as eastern Tennessee and central Georgia, as far south as Tampa Bay on the west coast of Florida and as far west as eastern Texas and central Arkansas. The requirements for lead pencil material are very exacting — a soft wood, fine and straight-grained, free from defects, which will not warp or check. The heartwood of red cedar meets these requirements and has the additional special qualities of being light in weight, non-resinous, slightly aromatic, whittling well and having an agreeable taste. One of the earliest woods used for lead pencils abroad was red cedar grown in Virginia and Florida. After red cedar became the expensive pencil wood foreign manufacturers forfeited their position of importance to America. The first successful plant in this country was started by Eberhard Faber in 1861 in New York City. His cedar-and-graphite pencil deposed the quill pen. The raw material for pencils is known as a pencil slat and is 7¼" x 2½" x ¼". These slats are manufactured in the Southern States and are shipped in bundles or crates to the manufacturers, a crate containing the raw material for 100 gross of pencils. The details of the manufacture of a pencil are simple but interesting. A slat is first run through a machine which makes six grooves in it. Six pieces of lead are then laid in the grooves and a coating of glue applied. Another slat is then laid over the top. The whole is then run through another machine which cuts out the material between the leads, producing a pencil in the rough state. The pencil is then polished, painted, stamped and graded. Several large factories are located in the vicinity of New York City and Brooklyn. The scarcity of the raw material and the enormous consumption of wood, something like 315 million pencils being manufactured annually, has resulted in high prices for raw material. Even old fence rails in the South bring a good price.

Basswood is the second wood of importance and is used for many of the other articles enumerated, especially for yardsticks, rulers, drafting tables, and alphabet blocks. It is largely homegrown and costs $34.29 per M. feet f. o. b. factory. The manufacture of advertising novelties is very important in the largest cities and in several smaller places, including Bliss, Seneca Falls, Silver Springs and Tonawanda, where the major portion of the basswood and sugar maple reported is turned into yardsticks and rulers as advertising novelties. These factories cause basswood and sugar maple to rank next in importance to red cedar.

The next most important industry in the table is that of cameras and kodaks. Rochester and Lestershire have camera works of national reputation, consuming for camera boxes and parts much basswood, beech, butternut, cypress, hickory, mahogany, spruce, sugar maple, white oak and yellow poplar.

Penholders are made almost exclusively from red gum; level blocks are made from cherry; thermometers from white oak; planes from beech; easels from beech and soft maple; surveyor stakes from oak,

longleaf pine, chestnut and hickory; drafting tables and equipments from white ash, basswood, beech, mahogany, yellow birch and white pine.

TABLE 16.— PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Red cedar	15,750,000	79.5	$37 55	$591,375	.....	15,750,000
Basswood	1,748,200	8.8	34 29	59,951	1,069,200	679,000
Sugar maple	862,000	4.3	38 39	33,089	247,000	615,000
Yellow poplar	475,000	2.4	47 37	22,500	.....	475,000
Cherry (black)	315,700	1.5	53 71	16,957	60,000	255,700
Beech	188,000	.9	25 35	4,766	188,000	.....
Red gum	75,000	.3	30 00	2,250	.....	75,000
White pine	71,500	.3	51 05	3,650	1,500	70,000
White oak	57,500	.2	51 70	2,973	15,000	42,500
Birch	57,300	.2	48 43	2,775	57,300	.....
Red oak	53,500	.2	38 81	2,078	11,000	42,500
Silver maple	40,000	.2	31 25	1 250	25,000	15,000
Butternut	30,000	.1	45 00	1,350	30,000	.....
Boxwood	25,000	.1	100.00	2,500	.....	25,000
Longleaf pine	22,600	.1	44 47	1,005	.....	22,600
Spruce	16,000	.0	47 00	752	16,000	.....
Mahogany	11,000	.0	120 64	1,327	.....	11,000
Ash	6,000	.0	30 00	180	6,000	.....
Hickory	3,000	.0	38 67	116	500	2,500
Chestnut	2,500	.0	35 00	88	.....	2,500
Cypress (bald)	2,000	.0	55 00	110	.....	2,000
Total	19,811,800	100.0	$37 91	$751,045	1,726,500	18,085,300

CASKETS AND COFFINS.

Seventeen woods are consumed locally for the production of caskets and coffins and 18,161,000 feet of raw material brings an average price of $33.18 per thousand. Three woods, mahogany, Circassian walnut and satinwood, are exported from foreign shores for the outside finish of high grade caskets. The industry not only includes caskets, but also rough outer boxes, which explains the use of much ordinary wood. Two styles of caskets are made, usually the finer class being finished in natural wood and the others being covered with dark woolen cloth. Since the cloth covered ones are in more extensive use, the woods most suitable for these, including chestnut and white pine, are the principal species contributing to the industry. Chestnut has the capacity to resist decay and it contributes more than 50 per cent. of the raw material for the whole industry. Some of the larger factories depend almost entirely upon chestnut and white pine. Because chestnut resists decay and because minor defects such as worm holes do not interfere with its usefulness in this industry,

its utilization in the form of even low grade stock is possible. The low average price of $24.12 is accounted for by the use of the standard grade known as "sound, wormy." The well selected high grade stock of chestnut is sometimes used as outside material, but generally it is used as a backing with veneer of the more expensive woods or as the body of a cloth-covered coffin. Mahogany and yellow poplar, white and red oak and birch are all popular outside woods.

White pine, shortleaf pine and yellow poplar are generally used for the outer boxes and shipping cases. Bald cypress is imported because of its resistance to decay in contact with the soil and throughout the nation it is one of the principal casket woods. Red cedar, like the bald cypress, comes from the south. It has the recommendation of being very durable, holding its form well, taking a pleasing finish and having an agreeable odor. Like cypress it is one of the most enduring woods in the United States; the comparatively small amount today used is only an evidence of the scarcity of the wood, it formerly being extensively employed everywhere for the burial of the dead. A small amount of California redwood finds its way across the continent for use in this industry because of its capability to resist decay in contact with soil, its average price of $55 per M. f. o. b. factory in New York not interfering with an occasional order for this use. Black walnut is the most expensive native wood, bringing $89.62 per thousand, and is one of the most workable woods for exterior finish.

There is much chestnut on the woodlots of New York that might be utilized in the casket and coffin industry except for the fact that the large corporations engaged in the industry very generally prefer to obtain their stock from the wholesaler situated in the larger timber areas of West Virginia, Kentucky and North Carolina. The purchasing agent of the largest manufacturer of caskets and coffins stated that even the blighted chestnut throughout the State would make very satisfactory material, but that the raw material is so scattered and the condition of the stock coming from smaller mills and jobbers so irregular that he could not at present devise a way to economically market the mill output of the State. There must be some means devised for standardizing the chestnut output of the woodlots throughout the State before the general purchasing agent of a large corporation can see his way clear to buy at home. The total figures for this industry place New York far in the lead of other States as producers of caskets and coffins. Large factories are located in New York, Brooklyn, Buffalo, Rochester, Elmira, Oneida, Syracuse and Webster and other points throughout the State and it is becoming a very important consumer of raw material. No other industry as a whole contains so large a percentage of wood for the finished article as caskets, and woodlot owners and mill men should study carefully the possibilities of supplying these large establishments with the 18,000,000 feet consumed annually at their doors.

TABLE 17.—CASKETS AND COFFINS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Chestnut	9,199,000	50.65	$24 12	$221,897	380,000	8,819,000
White pine	4,331,000	23.85	28 20	122,129	173,000	4,158,000
White oak	1,658,000	9.13	54 84	90,926	16,000	1,642,000
Yellow poplar	979,000	5.39	35 25	34,506	.....	979,000
Mahogany	510,000	2.81	134 27	68,478	.....	510,000
Red oak	481,000	2.65	45 72	21,992	16,000	465,000
Cypress (bald)	425,000	2.34	48 11	20,445	.....	425,000
Shortleaf pine	240,000	1.32	21 00	5,040	.....	240,000
Basswood	149,000	.82	35 64	5,310	27,000	122,000
Red cedar	85,000	.47	52 06	4,425	.....	85,000
Birch	35,000	.19	22 00	770	.....	35,000
Cucumber	20,000	.11	33 50	670	.....	20,000
Redwood	15,000	.08	55 00	825	.....	15,000
Black walnut	13,000	.07	89 62	1,165	8,000	5,000
Cherry (black)	11,000	.06	56 82	625	1,000	10,000
Circassian walnut	5,000	.03	250 00	1,250	.....	5,000
Satinwood	5,000	.03	250 00	1,250	.....	5,000
Total	18,161,000	100.00	$33 13	$601 703	621,000	17,540,000

BASKETS AND FRUIT PACKAGES.

The products referred to in Table 18 includes crates for the shipment of bananas, celery, peaches, potatoes, small berry and lettuce boxes, hop-picking boxes, bushel crates and the lighter class of fruit and vegetable packages. It was impossible to clearly separate in every instance these figures from the kindred industry of dairymens', poulterers' and apiarists' supplies, nor from the larger industry of packing boxes and crates. Baskets was the only item easily distinguished. In many establishments only one article, say berry boxes, was produced, while in many general box establishments the specific article produced was separated wherever possible. The data for baskets, small fruit and vegetable cratings were segregated. Much of the consumption of raw material was doubtless reported under the general description of packing boxes and crates. Berry boxes and small crates are generally thin veneer. Only the bottoms, tops and corner parts of the heavier articles, such as potato and cabbage crates, are made of ordinary lumber, while even these pieces are generally ¼" to ½" thick, lightness being necessary to avoid excessive freight rates on cheap produce.

New York is foremost in the production of fruit and vegetables. The following total of 18,007,250 feet is probably less than one-fourth of the actual amount consumed for the marketing of the State's horticultural and garden products, the major portion of the lumber consumption for this industry being given under Table IV.

Hardwoods predominate in the industry because strength and toughness are needed in the small dimension stock used. The proportion of beech is twice that of any other wood and it is used for almost every article in the industry, but the major portion of it goes into tops and bottoms of baskets. Hard maple and basswood are also used for covers and bottoms of baskets. Hoops, handles and potato crate slats are largely made of elm, basswood and beech, while the corner pieces, sills and posts of crates are generally made from chestnut, elm, oak and ash. The standard rims for baskets are frequently made of red and white oak, while the heart pieces of oak sometimes go into basket handles. Bushel crates consume birch, cherry, silver maple, white ash and elm. Silver maple is used for lettuce boxes and is available generally wherever truck gardening is extensive. Elm also forms bands for baskets. Yellow poplar, hard maple and ash are used extensively for basket staves. White pine and spruce are preferred for the more fancy apple and fruit packages. The consumption of local raw material throughout the State is noticeable, which results in the low average cost of $18.51 per thousand feet, the cost being lower than any other industry except excelsior.

TABLE 18.— BASKETS AND FRUIT PACKAGES.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Beech	4,013,500	22.29	$17 93	$71,942	3,164,500	849,000
Sugar maple	2,480,400	13.77	17 60	43,653	2,265,400	215,000
Elm	2,260,550	12.55	17 95	40,570	2,036,550	224,000
White pine	1,857,000	10.31	20 25	37,597	782,000	1,075,000
Basswood	1,426,400	7.92	19 09	27,226	1,276,400	150,000
Silver maple	1,391,500	7.74	18 53	25,839	940,500	454,000
Spruce	1,205,000	6.69	18 68	22,510	655,000	550,000
Hemlock	719,000	3.99	16 56	11,906	689,000	30,000
Birch	714,000	3.97	18 74	13,382	702,000	12,000
Cottonwood	528,000	2.93	17 30	9,134	528,000	.....
Chestnut	452,000	2.51	16 33	7,380	448,500	3,500
Hickory	230,200	1.28	18 18	4,184	230,200	.....
Red gum	163,000	.91	24 56	4,004	.....	163,000
Ash	128,300	.71	19 40	2,489	103,300	25,000
Yellow poplar	123,000	.68	34 68	4,266	36,500	86,500
White oak	108,000	.60	27 04	2,920	88,000	20,000
Red oak	87,300	.49	21 92	1,914	82,300	5,000
Red pine	50,000	.28	22 00	1,100	50,000	.....
Black cherry	44,000	.24	18 41	810	44,000	.....
Willow	12,100	.07	14 38	174	12,100	.....
Pitch pine	10,000	.06	24 00	240	10,000	.....
Butternut	1,000	.01	25 00	25	1,000	.....
Total	18,007,250	100.00	$18 51	$333,265	14,145,250	3,862,000

Excelsior.

In New York, as elsewhere, cottonwood is the favorite excelsior wood. Any soft wood that has a fairly long or tough fibre will make excelsior. Several woods, among them being chestnut, are soft enough and have the quality of workableness but are not suitable for excelsior because they break after becoming dry. Many kinds of wood are used in the United States, including in addition to those listed in New York, birch, maple, white ash, cherry, yellow pine, white pine, tamarack, cypress, hemlock, black and red gum. New York leads all States in the number of establishments producing excelsior and is only exceeded by Virginia and Wisconsin in the output of this product. New York has a great abundance of raw material suitable for excelsior, especially that of the ideal excelsior material, cottonwood. This industry is supplied almost entirely from timber grown in New York and the average cost of the raw material for all woods is only $16.87. Basswood is even better than cottonwood but it is not so generally available at local points. All cottonwood does not make excelsior but many species are excellent. The stock must be free from knots but may be made from small timber of short lengths and thus utilization can be made of much timber that is not fit for the sawmill. There is not much timber left on an acre where the excelsior machines have taken their needs. The utilization is close in the factory and everything is salable, even the roughest product being sold to liverymen for stable bedding or to nurserymen for shipping young trees. Some thick end slabs in the mill can be worked, but other mill waste, such as strips and shavings, cannot be converted into excelsior because its manufacture involves shaving the wood into strings from the face of the block. Excelsior is made in a lathe-like machine in which the block revolves slowly and the wood is peeled from it in splinters or fibres. The logs must be perfectly dry. They should be seasoned for six months and then cut into blocks and quartered. The blocks are fastened into the machine and automatically fed. A series of sharp spurs, generally eight inches wide and set less than an inch apart revolve rapidly against the surface of the block to a depth less than the thickness of a match. A knife follows these scrapers planing the block to the depth of the scoring, causing a bunch of curly excelsior or wide fibre to fall from the block. Great improvements have been made in machinery and the industry will become very important in New York State. The excelsior is reduced to great fineness and its uses have multiplied accordingly. Besides constant use in general packing it is in demand by upholsterers of furniture, manufacturers of carriages, mattresses and chairs and for bedding. It is also used extensively for shaping dolls and toy animals. One New York mattress factory is reported to use a carload of excelsior daily.

The excelsior industry like the newspaper industry gives the closest utilization of raw material placed at the door of the factory and like

the paper business it is becoming one of the great industries of the State. The armies of the world are using excelsior for filling mattresses; the manufacturers of china and glass not only protect shipments from breakage but avoid dampness which formerly existed when straw and hay were used. Wood wool is only one-third the weight of hay and is crowding the older packing material out of the markets through its lightness of weight, cleanness and assortable condition for packing. Kennel and stable bedding, filtering mediums for beer, packing fancy goods, ornamenting shop windows, decorating fire grates and innumerable other uses requiring elastic, pliable, clean and bright packing material all invite the establishment of excelsior plants in the various favored woodlot areas of the State of New York.

TABLE 19.— EXCELSIOR.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Cottonwood	11,964,000	81.41	$16 50	$197,435	11,139,000	825,000
Basswood	2,080,000	14.15	18 03	37,510	1,980,000	100,000
Yellow poplar	603,000	4.10	20 31	12,245	603,000	.....
Butternut	50,000	.34	16 00	800	50,000	.....
Total	14,697,000	100.00	$16 87	$247,990	13,772,000	925,000

REFRIGERATORS AND KITCHEN CABINETS.

This industry includes ice chests, kitchen cabinets, kitchen safes, kitchen counters, ice cream freezers and refrigerators. Twenty-four species are reported and the consumption amounts to 12,268,700 feet, for which the manufacturers pay a total of $394,316 or $32.14 per thousand feet. Five species, white oak, red oak, ash, spruce and white pine, contribute nearly 80 per cent. of the raw material.

Table 20 is aimed to cover that class of articles used in the storage and preparation of food stuffs for cooking, excepting the small woodenware articles such as tables and spoons. Much of the wooden material used in refrigerators and kitchen cabinets and similar receptacles for food must be free from stain and odor. In addition to these qualities, especially for such uses as inside parts of refrigerators, woods must stand dampness and must scour well and give effective service where constant washing is necessary. Thus woods of quite different qualities are consumed in the production of these articles.

Approximately 75 per cent. of all the lumber used goes into refrigerators. Here, especially for outer parts, the combination of strength and capability of taking a good finish is essential. The oaks

Photo by Hugh P. Baker.

TYPICAL SCENE IN THE BLACK FOREST OF WESTERN GERMANY.

The Black Forest covers a low mountainous region much like the Adirondacks with many of the same difficulties as to accessibility and market and yet the forest there is managed under the selection system and reproduced by natural means. It is producing as high as $2 to $4 per acre per year. Note the large number of stems per acre in comparison with the small number of stems as seen in typical virgin forest of New York.

are best suited and properly occupy first place, with ash following closely. Outside finish also consumes a small amount of mahogany and Circassian walnut, maple, birch and chestnut. Ash, hickory and elm are especially suited for slats in refrigerators, for ice counters or frames, where great strength, stiffness and damp-resistance must be found in slender strips of wood. For inside partitions where the wood is hidden by metal linings, spruce and white pine are generally used. Ordinary ice boxes for cellar use are sometimes made entirely of spruce. Ice cream freezers are made of red wood, this species coming all the way from the Pacific coast as the sole raw material going into this article. Ice cream cabinets are made of the various pines, the 100,000 feet of loblolly reported going entirely into freezer cabinets. A large amount of white pine is used for refrigerator backs and much of the longleaf pine reported is also used for this purpose. The second largest item in the table is that of kitchen cabinets, the rather modern carry-all or storage place for cooking utensils and dry foodstuffs.

Generally speaking, the principal species used for this branch of the industry are white oak, red oak, yellow poplar, sugar maple, basswood, birch, red gum and shortleaf pine. There is much confusion in the uses of the woods, but the particular uses of some can be pointed out. Red gum, for example, is very generally used for drawer bottoms. Maple, basswood, birch and ash are generally used for inside construction and the oaks for exterior finish. A large amount of yellow poplar is consumed for kitchen cabinet tops. Spruce is the most important homegrown wood in the industry, its contribution amounting to over 1,000,000 feet and it is the principal wood used for interior walls and partitions of refrigerators. Its cost of $29.41 per thousand f. o. b. factory is almost $3 below the average of all woods contributing to the industry.

There is not much waste in this industry. Larger firms report the manufacture of brackets of various kinds from refrigerator dimension stock. Small blocks for brackets, carvings and turnery for decorative purposes make close utilization of the odds and ends of the valuable domestic and imported woods.

TABLE 20 — REFRIGERATORS AND KITCHEN CABINETS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
White oak	3,305,500	26.94	$35 12	$116,097	470,500	2,835,000
Red oak	1,935,500	15.78	34 73	67,216	145,500	1,790,000
Ash	1,798,500	14.66	28 83	51,859	859,500	939,000
Spruce	1,439,000	11.73	29 41	42,316	1,140,000	299,000
White pine	1,315,500	10.72	26 44	34,788	615,000	700,500
Yellow poplar	667,000	5.44	40 53	27,034	25,000	642,000
Sugar maple	378,500	3.09	23 95	9,064	28,500	350,000
Red gum	200,500	1.63	40 02	8,025	.....	200,500
Birch	168,500	1.37	19.85	3,345	108,500	60,000
Redwood	155,000	1.26	39 84	6,175	.....	155,000
Bald cypress	150,000	1.22	46 67	7,000	.....	150,000
Hickory	150,000	1.22	50 00	7,500	50,000	100,000
Shortleaf pine	105,000	.86	30 43	3,195	.....	105,000
Loblolly	100,000	.82	14 00	1,400	.....	100,000
Basswood	95,000	.78	24 72	2,348	35,000	60,000
Chestnut	85,000	.69	19 24	1,635	15,000	70,000
Silver maple	60,000	.49	23 00	1,380	.....	60,000
Hemlock	50,000	.41	20 00	1,000	50,000	.....
Elm	34,700	.28	21 01	729	34,700	.....
Red pine	25,000	.20	25 00	625	.....	25,000
Pitch pine	25,000	.20	18 00	450	25,000	.....
Longleaf pine	24,000	.20	40 00	960	.....	24,000
Mahogany	1,000	.01	100 00	100	.....	1,000
Circassian walnut	500	*	150 00	75	.....	500
Total	12,268,700	100.00	$32 14	$394,316	3,602,200	8,666,500

* Less than 1-100 per cent.

TANKS AND SILOS.

This industry ranks twentieth among the forty-seven industries of the State and is therefore very important in the consumption of wood throughout the commonwealth. The table includes silos, all kinds of water tanks, such as cisterns, vats, rough tanks, wagon tanks, sprinkling boxes, water troughs and framework supporting tanks. The modern silo and its construction are important items in farm management today. Its history dates back to those of French construction sixty years ago. Several forms have been used, but the round silo is considered to be the only perfect one, it being free from accumulations of poisonous and decaying ensilage in corners. Most silos in this country are made of wood, but the high price of wood has led at times to the substitution of other material, such as metal, stone and cement. A typical silo has a diameter of about 16 feet and a height of 25 feet and a capacity of 100 tons of ensilage, consisting of mixed corn, grain and hay, which is worth $500 to $1,000 and will feed about 30 cattle for 180 days. It requires about 114 staves and a total of about 3,000 feet of lumber to produce it. It is said that a silo will more

than pay for itself in economy the first year. Besides the great advantage of increasing the fattening capacity of the food there is the the great economic saving of long trips through the fields in mud, snow and cold daily for feed.

Retail lumberman have developed a prosperous industry in farming communities. Formerly extensive silo manufacturers went into the south, purchased their lumber, manufactured the articles and sold directly to the farmer through their agents. Today many retail lumber yards devote their leisure hours to the production of these farm articles. There is not much additional space required for the storage of a few silos within the lumber yards. Bald cypress is the leading tank and silo wood. It is found in commercial quantities in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, Missouri, North and South Carolina, Tennessee and Texas. In 1878 the amount of standing cypress in the United States was estimated to be 27,000,000,000 feet, but the cut has been far in excess of its slow growth. It is claimed for it that the wood imparts no taste and that it is sufficiently dense to prevent leakage, strong enough to withstand rough usage, and has the great capacity to resist dampness, excessive heat and all the elements that hasten decay. Water and feed troughs for farm stock are made of it.

The tank industry includes many kinds of vessels such as are used in factories to hold tanning extracts, malts and acids. Wooden and iron tanks for windmills are in general use, while large quantities of wood go into railroad water tanks.

Spruce is the second item in the industry and is used largely as supports and framework for tanks. Hemlock, ash and several other woods are also thus used. White oak goes into slats for tanks and water elevators or supports. White pine is used largely in the construction of ordinary rough tanks and for frame cisterns. The industry is growing and will become a more important user of wood in the State of New York.

TABLE 21.— TANKS AND SILOS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Cypress (bald)	2,580,550	22.77	$40 45	$104 384	.....	2,580,550
Spruce	2,370,000	20.91	21 94	52,005	85,000	2,285,000
Hemlock	1,190,000	10.50	24 39	29,030	380,000	810,000
White oak	1,130,000	9.97	32 95	37,230	105,000	1,025,000
White pine	1,090,300	9.62	31 41	34,241	665,300	425,000
Red pine	950,000	8.38	29 37	27,900	.....	950,000
Ash	500,000	4.41	25 00	12,500	.....	500,000
Western larch	420,000	3.71	29 40	12,350	.....	420,000
Longleaf pine	408,700	3.61	28 67	11,716	.....	408,700
Arborvitae (northern white cedar)	240,000	2.12	37 50	9,000	.....	240,000
Sugar maple	135,000	1.19	17 41	2,350	75,000	60,000
Beech	125,000	1.10	16 00	2,000	60,000	65,000
Pitch pine	50,000	.44	25 00	1,250	50,000	.....
Red oak	50,000	.44	25 00	1,250	50,000	.....
Loblolly pine	30,000	.27	25 50	765	.....	30,000
Red cedar	30,000	.27	46 67	1,400	.....	30,000
Shortleaf pine	28,400	.25	28 20	801	.....	28,400
Basswood	5,000	.04	40 00	200	.....	5,000
Total	11,332,950	100.00	$30 03	$340,372	1,470,300	9,862,650

CIGAR BOXES.

The cigar box industry in one that consumes a small variety of woods. Spanish cedar, as will be noted, supplies almost 85 per cent of the 10,115,000 feet consumed in New York State annually. Cotton gum or tupelo, as it is sometimes called, is the only other wood of importance from the standpoint of quantity. Spanish cedar is generally converted into very thin lumber or veneer and used as an outside material with other woods as cores or backing. A very small amount of cotton gum and yellow poplar are made into boxes without being overlaid with cedar. Generally the Spanish cedar is glued on the cheap domestic woods, such as yellow poplar, elm, etc.; but the great body of cigar box material is in the form of two-ply veneer and Spanish cedar as principal wood for this use. Except for cheaper boxes, Spanish cedar is used almost exclusively. It is bought by superficial measure, usually between ⅛" and 3-16" in thickness. For purposes of showing comparison of quantities, the veneer has been reduced to board measure, which accounts for the high price of $113.08 per thousand feet. The price per thousand feet, superficial measurement, usually ranges from $25 to $35 for Spanish cedar, $11 to $15 for gum, and $14 to $22 for yellow poplar. Several foreign woods contribute to this industry. The Circassian walnut is used with mahogany and rosewood for fancy boxes, humidors, cigar chests,

and other uses which do not expose the tobacco to contact with the wood. Spanish cedar is best for cigar boxes not only because of its beautiful grain and fine texture, but because of its aromatic odor. The gum, yellow poplar, and other imitations are stained to give the proper color, while the odor is artificially applied by treating the veneered lumber with a decoction of cedar shavings and sawdust. Cotton gum is sometimes made to imitate the Spanish cedar by passing the thin lumber between rollers with minute teeth by which the wood is indented so that it has the appearance and characteristics of cedar.

The industry has comparatively little waste because most all of the lumber can be used by thin slicing of the board or log, and by using the cedar shavings and sawdust in covering other woods. Most of the Spanish cedar is imported from Mexico, Central America, and the West Indies. This is the only extensive industry in the State that draws on the outside world for every foot of its raw material. Five of the nine woods consumed do not grow in the State, and it so happens that the remaining four woods, elm, white oak, yellow poplar, and basswood, are purchased from outside markets. This industry pays the highest price for its raw material, the average being $104.04 per thousand feet. The range in price is from $39.24 for elm to $300 for Circassian walnut. The cost of the raw material far exceeds that of any other industry in the State, the next highest average being that for firearms which average $68.65, while that for aeroplanes, which call for a very high class of material, pays $67.99. The high price of the material going into the industry is realized when we compare its cost of $104.04 with the average of $30.76 for all industries in New York State.

There is very little waste in the manufacture of cigar boxes. The saw mills supplying cigar box lumber generally take the round logs in the rough and manufacture dimension stock sawed to thickness and width but random length and shipped in the rough, wet or air-dried and planed as the consumer of the material desires. The dimension stock is frequently cut into multiples of the sizes desired for specified cigar boxes. Every inch of lumber that is available from the log for cigar boxes is used up to the point where the value of labor and the value of the stock balances. In the vicinity of New York City and other large municipalities of the State the sawdust and shavings from a large mill are sometimes sold on a monthly contract at a fair price to concerns who sort and re-grade and who job in sawdust and shavings. Spanish cedar sawdust is used for smoking meat, lining ice boxes and making explosives. No other industry in the State utilizes more closely the raw material brought into the factory. New York is one of the largest importing states for logs and rough stock of this kind and close utilization for by-products is essential to economic administration of the plant engaged in this industry. The total expenditure makes the cigar box industry tenth in importance in New York when considered from the standpoint of cost of the raw material.

TABLE 22.— CIGAR BOXES.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Spanish cedar	8,580,500	84.82	$113 08	$970,298	.....	8,580,500
Cotton gum	891,800	8.82	48 14	42,933	.....	891,800
Yellow poplar	264,000	2.61	41 63	10,990	.....	264,000
Mahogany	161,200	1.59	86 79	13,990	.....	161,200
Elm	112,500	1.11	39 24	4,415	.....	112,500
White oak	103,200	1.02	93 08	9,606	.....	103,200
Basswood	2,000	.02	40 00	80	.....	2,000
Circassian walnut	250	*	300 00	75	.....	250
Rosewood	100	*	250 00	25	.....	100
Total	10,115,550	100.00	$104 04	$1,052,412	.....	10,115,550

*Less than 1/100 of 1 per cent

PUMPS.

The manufacturers of pumps in the State consume nearly 10,000,000 feet of lumber annually and expend $283,625 for their wood, an average price of $28.93 per thousand. The low average price is due to the use of much stock in the rougher platforms and coverings where ordinary grades of lumber will suffice. All of the wood used in this industry cannot be accounted for in a wood-using study. To begin with, metal substitution of all parts of pumps, including piping, rods and handles, has become so general that the proportion of wood to the total raw material consumed by the industry is relatively unimportant. Many large pump manufacturers are not even listed as wood-using establishments and their utilization of wood is necessarily lost sight of in this study. Again, some pump-handle stock is doubtless accounted for in the returns from handle factories and cannot be identified as pump handles. This large amount of wood consumed is very significant, however, and is evidence of the importance of the pump and the pump machinery industry in New York. While metal is used extensively, all parts of pumps are still occasionally made of wood and the wood-using returns account for pump piping, tubing, rods, handles, platforms, coverings, steam pipe casing, water pipes, well buckets, cylinders, etc.

White pine overshadows all other species and supplies nearly 84 per cent. of the raw material, the major portion of it going into steam pipe casing, water pipes, pump tubing, siding, curbing and covering. Well buckets are made of maple, ash, beech and white oak; pump handles and rods of white oak, white ash, red oak and beech; water pipes of white pine, yellow poplar and maple. All of the half million feet of cypress is imported from the South and goes into pump platforms, its low cost of only $22.50 per thousand indicating

that only a low-grade stock is used. Yellow popular at $44.19 is the most expensive wood, its use for water pipes calling for a fair grade of stock free from knots and other serious defects.

TABLE 23.— PUMPS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
White pine	8,197,000	83.60	$29 96	$245,610	1,187,000	7,010,000
Silver maple	550,000	5.61	25 00	13,750	275,000	275,000
Sugar maple	506,000	5.16	21 97	11,118	6,000	500,000
Cypress (bald)	500,000	5.10	22 50	11,250	.....	500,000
Yellow poplar	31,000	.32	44 19	1,370	18,500	12,500
Tamarack	12,000	.12	20 00	240	12,000	.....
White oak	3,800	.04	39 21	149	3,800	.....
Beech	2,500	.02	19 20	48	2,500	.....
Red oak	2,000	.02	40 00	80	2,000	.....
Ash	500	.01	20 00	10	500	.....
Total	9,804,800	100.00	$28 93	$283,625	$1,507,300	8,297,500

WOODENWARE AND NOVELTIES.

Probably no industry in the whole report contains so many separate, distinct articles of commerce as are tabulated under the above heading of Woodenware and Novelties. The ordinary household articles known as "woodenware" and the more ornamental article known as a "novelty" are not so much confused in their makeup and uses as is their production. Establishments that make one are so frequently manufacturers of both classes of material, consuming similar stock and reporting their consumption of raw material together, that it is not an easy matter to compile the data separately. The best way to outline the scope of this classification is to enumerate many of the articles included in the total of 8,364,900 feet reported in Table 24. The principal wood-consuming products are: bread boards, buckets, butter dishes, button molds, cloth boards, coat hangers, clubs for policemen, cutting boards, doilies, door knobs, drain boards, gavels, small kegs, ladders, lapboards, measures, pails, plates, flag poles, hose reels, rolling pins, snow shovels, tent stakes, tent toggles, small tubs, and sugar tubs and boxes. Thus the industry includes all kinds of serving utensils and other culinary articles of the smaller size, together with semi-useful and more ornamental articles such as wooden candle sticks, paper weights, carvings, jewel boxes, etc. Much of the material going into these articles, especially such as dishes, is made of rotary-cut veneer, produced directly from the log, and is very cheap since the finished articles are intended to be used only once and then thrown away. Among such articles are dishes used by grocerymen

for the handling of butter and lard. The hardwoods that are cheap, easily veneered, free from odor and stain, are in general demand, the principal contributing species being spruce, basswood, beech and sugar maple. In some novelty lines the softwoods are very important, most of the shortleaf and white pine reported going into such articles as small flag poles. The hardwoods, particularly ash and maple, are turned into rustic novelties. The major portion of the consumption of birch, aspen, cucumber, hackberry, sassafras and black walnut goes for the production of rustic and other novelties. Ladders are manufactured by many firms and the principal contributing species are ash, maple, oak and hickory. Approximately 788,000 feet of ash goes into ladders. Most of the ash and maple is used for ladder rungs. The foreign woods are used for carvings of the more ornamental kind and for gavels, police clubs, etc. New York manufacturers expend annually over $250,000 for the raw material going into these small wares and most of this money goes into the purses of the woodlot owners of the State.

TABLE 24.— WOODENWARE AND NOVELTIES.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Spruce	1,949,000	23.30	$32 88	$64,073	884,000	1,065,000
Basswood	1,721,200	20.58	30 13	51,856	1,451,200	270,000
Beech	1,014,000	12.12	15 59	15,812	1,014,000	.....
Ash	788,500	9.43	32 06	25,280	633,500	155,000
Hickory	568,500	6.80	43 24	24,582	408,500	160,000
White pine	438,500	5.24	29 01	12,722	257,500	181,000
White oak	406,000	4.85	42 53	17,268	210,000	196,000
Sugar maple	317,500	3.80	18 92	6,006	297,500	20,000
Shortleaf pine	220,000	2.63	16 18	3,560	.....	220,000
Birch	187,500	2.24	20 41	3,826	167,500	20,000
Yellow poplar	145,500	1.74	39 90	5,805	26,500	119,000
Red oak	145,000	1.73	44 66	6,475	58,000	87,000
Elm	109,000	1.30	18 40	2,006	109,000	.....
Red pine	75,000	.90	44 00	3,300	.....	75,000
Douglas fir	65,000	.78	43 05	2,798	.....	65,000
Butternut	39,000	.46	20 00	780	39,000	.....
Cottonwood	38,000	.45	16 00	608	38,000	.....
Cucumber	37,000	.44	20 00	740	37,000	.....
Chestnut	31,000	.37	28 97	898	31,000	.....
Silver maple	20,000	.24	25 00	500	.....	20,000
Loblolly pine	19,000	.23	30 50	580	.....	19,000
Cherry (black)	12,000	.14	20 00	240	12,000	.....
Longleaf pine	10,000	.12	37 50	375	.....	10,000
Aspen	5,000	.06	10 00	50	5,000	.....
Mahogany	1,500	.02	170 00	255	.....	1,500
Sassafras	1,500	.02	21 00	32	1,500	.....
Red cedar	500	.01	25 00	13	500	.....
Black walnut	200	*	40 00	8	200	.....
Total	8,364,900	100.00	$29 94	$250,448	5,681,400	2,683,500

* Less than 1/100 of 1 per cent.

Picture Frames and Mouldings.

The products included in Table 25 are mirror frames, picture frames, mirror backs, picture mouldings and picture backs. As can be seen by the nature of the article produced, there is comparatively little waste. Indeed, much of the material consumed by this industry is the waste of the larger woodworking establishments like planing mills products, sash, doors, blinds and general millwork. While these latter establishments sometimes produce these smaller articles from the waste of their mills, there are many minor plants in the cities and towns that specialize in such articles. The total of 7,514,450 feet is probably far short of the total consumption for such articles in the State, but the real consumption of wood cannot be separately shown because planing mills and general millwork establishments make their reports without distinguishing the exact amount going into such by-products. These figures indicate, however, that the aggregate production of the State for picture frames and mouldings is enormous when such a large total can be accounted for through the reports of the small specialty factories. The industry consumes 19 woods and pays the average price of $44.74 per M feet f. o. b. factory. Nearly 2,000,000 feet comes from local woodlots, while only bald cypress, shortleaf pine, Circassian walnut and rosewood are not obtainable at all within the borders of the State. White oak is by far the most important species contributing to the industry and is used for mouldings of pictures. Other woods that are used entirely for mouldings are red oak, sugar maple, mahogany, black walnut, Circassian walnut and rosewood. White pine is suitable both for the facing and for the backs of picture frames because it is light and very workable. When used as mouldings it takes oils, paints and enamels well. Spruce, cottonwood, shortleaf pine and others are used almost exclusively for mirror and picture backs. The white oak is generally stained in such a way as not to interfere with the naturally pleasing appearance of the grain of the wood. Its high price is due to the fact that it is generally quarter sawn from No. 1 stock free of defects. Birch, chestnut, sugar maple, red gum, mahogany, black walnut, Circassian walnut and rosewood are popular in the manufacture of hand mirrors where both the facing and backing must be highly ornamental. The industry is rapidly growing in the State and the consumption is far in excess of the amount reported in any other State for such articles.

TABLE 25.— PICTURE FRAMES AND MOLDING.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
White oak	3,005,500	40.00	$45 87	$137,860	480,500	2,525,000
Basswood	1,137,500	15.14	39 44	44,858	174,000	963,500
Yellow poplar	749,250	9.97	42 67	31,969	102,000	647,250
Birch	647,000	8.61	46 33	29,975	543,500	103,500
Red oak	365,500	4.86	47 40	17,325	120,000	245,500
Chestnut	334,250	4.45	40 40	13,504	39,000	295,250
Cypress (bald)	271,000	3.61	34 12	9,246	.....	271,000
White pine	269,500	3.59	35 65	9,607	229,500	40,000
Spruce	225,000	2.99	28 00	6,300	225,000	.....
Red gum	188,750	2.51	42 73	8,066	.....	188,750
Sugar maple	140,400	1.87	48 25	6,774	45,400	95,000
Mahogany	72,450	.96	155 91	11,296	.....	72,450
Black walnut	46,600	.62	113 13	5,272	.....	46,600
Shortleaf pine	25,000	.33	35 00	875	.....	25,000
Cucumber	20,000	.27	55 00	1,100	.....	20,000
Ash	10,000	.13	40 00	400	10,000	.....
Circassian walnut	5,000	.07	320 00	1,600	.....	5,000
Cottonwood	1,000	.01	22 00	22	.....	1,000
Rosewood	750	.01	240 00	180	.....	750
Total	7,514,450	100.00	$44 74	$336,229	1,968,900	5,545,550

HANDLES.

New York though not a leading State is an important one in the production of handles. The Lake States and other central western States have the principal factories of the larger well known corporations manufacturing fork, hoe and axe handles. Nearly every large manufacturing establishment has need for handle stock in one form or another. A number of industries like broom factories and cutlery stock occupy a prominent place. Establishments producing farm tools, files, saws, cutlery and other metal implements call for a great variety of woods.

Beech leads all species in the amount of wood consumed because the principal handle business from a standpoint of quantity is that of brooms. Over 2,000,000 feet of the 3,076,000 feet of beech reported goes for such use. Broom handles also consume a large amount of sugar maple, birch and white ash. Shovel handles are made largely of sugar maple, while snow shovels consume a great deal of white ash. Axe handles are made of hickory, brush handles of sugar maple, pick and peavy handles of white ash, hickory and yellow birch; while handsaws consume only applewood and beech. Fork and hoe handles are rarely ever made of any wood except white ash, of which a large amount is consumed for this purpose in other States, and most of the half million reported in New York goes into these articles. White

ash is used for fork and hoe handles because it is tough, strong and white. Hammer handles are made of hickory generally, this wood being almost indispensable for slender tool handles where great stiffness, strength and elasticity must be combined. Hickory is used in the rougher forms for mop handles, handrakes, sledge hammers and pick handles, along with white oak, white elm and ash, where strength and resistance to sudden shock are essential requirements. Handles for coal sieves are made of basswood, beech, soft maple and white ash. Many of the firms reported several woods under the general use of "handles" and the relative importance of each wood in the production of a given style of handle cannot be accurately determined. Broad conclusions are easily reached, however, relative to the specific uses of such woods as ash and hickory, the former being very generally used here for fork and hoe handles, while hickory is used universally for small tool handles and for axe handles. Saw handles also depend largely upon apple and beech, while the ordinary cutlery or knife handles consume all of the foreign woods such as ebony, rosewood, coco-bolo and granadillo.

The form of the raw material going into handle factories is so varied, owing to the extremes in the dimensions of the finished articles, that detailed descriptions cannot be given. The class of handles including the stock for hoes, forks, rakes, spades and shovels, calls for squares of about 2 to 2½ inches and the extreme length of 5 feet. One large plant producing fork, hoe and rake handles uses clear white ash in the form of rough squares or strips 1⅝" by 1⅝" and 5 feet in length. Saw handles, on the other hand, are made from rectangular squares about 4½ inches wide, 1¼ inches thick and only 12 inches long, while from this small block two saw handles are cut. In the production of articles such as saw handles, where a scroll saw turns out two handles from a pattern requiring such dimensions, there is scarcely any waste. Broom handles are usually made from 2-inch squares about 5 feet long. Axe handles call for an entirely different class of raw material, which is generally purchased by the cord and in the form of billets or bolts, either split or in round timbers, and cut 40 inches long. Small tool handles, cooking utensil holders, brush and pump handles, all call for different forms of raw material, according to their special needs. There is much waste in some branches of this industry, especially the manufacturing of handle stock from bolts. The public has always demanded an ivory white axe handle to the exclusion of all heartwood. Specifications calling for all clear sapwood results in extreme waste. Forest Service tests have proven that a small amount of heartwood does not weaken the handles and manufacturers should promote a general movement to moderate handle specifications. The War Department has already consented to alter the specifications for handle stock for use in the Canal Zone, allowing a reasonable proportion of heartwood.

TABLE 26.— HANDLES.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Beech	3,076,000	47.52	$17 80	$54,767	2,973,000	103,000
Sugar maple	1,418,000	21.90	18 57	26,329	1,350,000	68,000
Birch	861,000	13.30	13 77	11,852	861,000	.....
Ash	466,400	7.20	29 91	13,952	251,400	215,000
White oak	336,500	5.20	40 59	13,660	232,500	104,000
Hickory	204,150	3.15	39 57	8,078	153,000	51,150
Basswood	37,000	.57	24 32	900	37,000	.....
Elm	30,000	.46	18 00	540	30,000	.....
Applewood	22,000	.34	68 50	1,507	.....	22,000
Silver maple	10,000	.15	15 00	150	10,000	.....
White pine	10,000	.15	32 00	320	10,000	.....
Lignum-vitae	1,500	.02	250 00	375	.....	1,500
Grandillo (cocowood)	685	.01	113 87	78	.....	685
Ebony	654	.01	330 00	216	.....	654
Rosewood	610	.01	130 00	79	.....	610
Cocobola	480	.01	160 00	77	.....	480
Total	6,474,979	100.00	$20 52	$132,880	5,907,900	567,079

LAUNDRY APPLIANCES.

The figures combined in Table 27 include the reports of establishments using wood for the manufacture of clothes hampers, clothes pins, clothes racks, clothes wringers, curtain stretchers, ironing boards, laundry mangles, sleeveboards, washboards, washtubs, washing machines, frames for the construction of washing machines and miscellaneous equipments for the general laundry business, such as special tables, benches, tanks, rollers for handles, etc.

The tub and tank parts of the industry consume the greater amount of wood and this accounts for the large amount of bald cypress reported, its contribution being over 2,000,000 of the 5,000,000 feet used, nearly all of which went into tanks and tubs, the average price paid for it being $37.17. This species has the commendable quality above all others of resisting decay in contact with water.

The next most important item is that of washboards, for which is consumed over 600,000 feet of beech, birch and sugar maple. Clothes pins are made largely of basswood, hard maple and beech, the first named wood contributing over 90 per cent of the raw material for pins, the aggregate of which amounts to nearly half a million feet. The single item of curtain stretchers totals up to over 350,000 feet, the major portion of which is yellow poplar and the balance basswood. Reels for machinery consume a small amount of hard maple and the small amount of cherry reported goes into collar trays. Special kinds of tables and boards needed for laundry offices and workrooms con-

sume over 50,000 feet of yellow poplar, longleaf pine and shortleaf pine, by far the greater portion being yellow poplar. White pine is used in small amounts for table tops, practically all of the 36,000 feet reported being used for this particular purpose. Ironing boards use about 400,000 feet of basswood; sleeve boards a small amount of birch; dashers use practically all of the elm, and its capacity to withstand rough treatment under trying conditions of heat and moisture commend it above other woods. Clothes hampers and baskets are generally made of basswood but a very small amount of pine is also reported for that use. For many uses sugar maple takes precedence over all other woods, including such articles as wheel repairs and all kinds of handles used in connection with the laundry business. Sugar maple is very important for mangle rollers, over 50 per cent of the 819,000 feet reported going into this article. General machine construction for laundries consumes cypress, sugar maple, basswood, yellow poplar and red and white oak.

Manufacturers of laundry appliances are quite conspicuous in the State and the grand total of 5,201,340 feet reported for these specialty lines places New York foremost in the industry. With the exception of cypress the major portion of the raw material is contributed by local woodlots.

TABLE 27.— LAUNDRY APPLIANCES.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Cypress (bald)	2,032,300	39.07	$37 17	$75,541	.....	2,032,300
Basswood	1,010,670	19.43	24 02	24,272	905,000	105,670
Sugar maple	819,000	15.75	23 44	19,195	269,000	550,000
Beech	575,000	11.06	20 13	11,575	225,000	350,000
Yellow poplar	311,200	5.98	44 89	13,970	7,500	303,700
Birch	203,000	3.90	18 06	3,666	203,000	.....
Elm	150,000	2.88	40 00	6,000	.....	150,000
White pine	36,670	.71	44 77	1,642	36,000	670
Shortleaf pine	21,600	.42	25 46	550	.....	21,600
Longleaf pine	19,900	.38	53 17	1,058	.....	19,900
Red oak	11,000	.21	40 00	440	5,000	6,000
White oak	9,000	.17	40 00	360	5,000	4,000
Cherry (black)	2,000	.04	72 50	145	.....	2,000
Total	5,201,340	100.00	$30 46	$158,414	1,655,500	3,545,840

ELECTRICAL MACHINERY AND APPARATUS.

Many of the larger electrical machinery supply houses of the nation are situated in this State. Large plants are located in the vicinity of New York, Buffalo, Rochester and Syracuse. While primarily metal working industries, these establishments consume a grand total of

4,602,860 feet of wood annually. No other State is so important in this line of manufacturing. The consumption of spruce is almost double that of any other species, and it is used almost exclusively for conduits, cable reels, lagging reels and spools for wire. One firm reports the use of over 700,000 feet for cable reels, etc. Other woods used for reels, in the order of their importance, are as follows: beech, white pine, yellow poplar, red gum and basswood.

Signal devices consume over 1,000,000 feet annually, nearly all of the arborvitae (northern white cedar) and practically all of the bald cypress going into railroad signal devices. These woods have the commendable quality of being able to withstand constant exposure to the elements. Other woods used for signals, in small amount, include hemlock, oak, red pine and shortleaf pine.

Rough telephone boxes are made of hemlock, white oak, red oak, yellow poplar and sugar maple. Telephone booths, styles, rails and panels demand high-grade stock of red oak, birch and white oak, much of the latter wood being quarter-sawed.

For framework and cores for veneer, chestnut and yellow poplar are largely used; while for "filling" between steel plates and blocks, white oak is preferred. Switch boards, telephone cabinets, and miscellaneous supplies call for cherry, white oak, white pine, beech, sugar maple, birch, yellow poplar, longleaf pine, black walnut, mahogany, rosewood, Circassian walnut.

Yellow poplar is used for base blocks for electrical contrivances, and is coming into very high favor instead of white oak for such use. It is more easily worked, warps and shrinks less, and is lighter and cheaper than oak. In large cities the electrical supply houses sell boards of yellow poplar at approximately 40 per cent below the price of white oak.

Many of the establishments supplying data for Table 28 use much high-grade stock, and the low average cost of $29.10 per thousand feet is due to the use of a large amount of cheap rough stock for cable reels, wire spools and conduits, for which purpose the low grade lumber from spruce, hemlock and beech proves very satisfactory. Circassian walnut, rosewood and mahogany each cost over $200 per thousand. Over 50 per cent of the raw material is home-grown, the local stock of spruce, arborvitae, oak, white pine, birch and hemlock contributing largely to this industry.

TABLE 28.— ELECTRICAL MACHINERY AND APPARATUS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Spruce	1,343,000	29.18	$23 69	$31,817	593,000	750,000
Arborvitae (northern white cedar)	735,000	15.97	11 01	8,085	735,000	.....
Beech	375,000	8.15	16 40	6,150	25,000	350,000
White oak	330,500	7.18	40 54	13,400	145,500	185,000
White pine	284,000	6.17	28 59	8,120	264,000	20,000
Yellow poplar	230,000	5.00	34 67	7,874	.....	230,000
Birch	220,200	4.78	41 29	9,091	120,200	100,000
Red oak	210,000	4.56	35 86	7,530	60,000	150,000
Shortleaf pine	132,000	2.87	28 00	3,696	.....	132,000
Hemlock	114,000	2.47	14 15	1,612	114,000	.....
Sugar maple	112,300	2.44	28 00	3,144	62,300	50,000
Chestnut	100,000	2.17	25 45	2,545	25,000	75,000
Basswood	84,000	1.82	32 14	2,700	84,000	.....
Black walnut	59,700	1.30	114 19	6,817	.....	59,700
Red pine	50,000	1.09	20 00	1,000	50,000	.....
Red gum	50,000	1.09	80 00	4,000	.....	50,000
Cypress (bald)	47,000	1.02	50 00	2,350	.....	47,000
Ash	40,000	.87	41 25	1,650	15,000	25,000
Mahogany	33,500	.73	205 01	6,868	.....	33,500
Longleaf pine	25,000	.54	40 00	1,000	.....	25,000
Circassian walnut	13,400	.29	250 00	3,350	.....	13,400
Cherry (black)	12,000	.26	50 00	600	12,000	.....
Rosewood	2,260	.05	250 00	565	.....	2,260
Total	4,602,860	100.00	$29 10	$133,964	2,305,000	2,297,860

MACHINE CONSTRUCTION.

Table 29 is made up of data reported from many of the establishments that manufacture and repair machinery of various kinds. The uses of wood herein are confined principally to sills, bases, platforms and other parts of machines that are made largely of metal. It is impossible to obtain complete data from the innumerable firms using a small amount of wood. Unless the establishment buys as much as a carload during a season it can scarcely be called a wood-using plant; yet the aggregate of consumption by machine and foundry stock, general metal manufacturing industries, together with contractors' work, would doubtless be many times the total wood reported in the following table.

The principal items reported come from manufacturing of oil drills and rigging, machines for road rolling, paper manufacturing, drain cleaning and hauling, broom-corn machinery, concrete, cider and wine presses, and the articles reported range, in importance of consumption, from the small item of 12,000 feet for fanning mills up to over 700,000 feet for broom-corn machinery.

Sugar maple leads all species and is pre-eminent in most of the manufactured products. Grain, rice and coffee-cleaning machines consume nearly 200,000 feet of sugar maple for machine frames, almost as much of elm and ash for the same purpose, and over 100,000 feet of yellow poplar for bodies of these machines. Cider and wine presses use more sugar maple than any other wood, and elm, basswood and white pine contribute considerable to this article. Handles for grinders of all kinds are made largely of beech and sugar maple. Contractors use much spruce and longleaf pine for grain run-ways. Bread-slicing machines utilize over 5,000 feet of white ash. Oil-drill machine frames utilize over half a million feet of hemlock and white oak. The major portion of the hickory reported goes into sucker rods for oil supply machinery, along with elm and beech for strips of various kinds. Road-rolling machines consume cypress for cab tops; hard maple for loading blocks; basswood for wagon bodies; white oak and ash for poles and axles; and spruce, hemlock and white pine for framework. Paper-mill machinery consumes over 100,000 feet of cypress for use as beating engines, a small amount of hard maple and cottonwood as rolls for paper machinery. Typewriting machine parts consume as much basswood. Contractors consume an appreciable percentage of every wood for general repair of machines. It is difficult to separate the data given here from agricultural implements, but in the main the articles enumerated are not agricultural implements. The table shows the total consumption of 4,565,900 feet, the total cost of which at the factory was $166,568, or $34.37 per thousand feet. Most of the raw material was grown in New York, bald cypress, loblolly pine, longleaf pine and shortleaf pine being the only woods not obtainable from New York State forests.

Photo by Courtesy of Conservation Commission.

TYPICAL VIEW OF PAPER MILL IN NORTHERN NEW YORK.

Such mills both in northeastern and northwestern sections of New York are using vast quantities of spruce and fir in the manufacture of paper pulp and paper. Future supply for these mills is a very uncertain matter and it is time from an economic standpoint, therefore, that the tremendously productive forest areas in the Adirondacks be thrown open to proper forest development.

TABLE 29.— MACHINE CONSTRUCTION.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Sugar maple	593,300	13.02	$29 56	$17,537	500,100	93,200
Hemlock	550,000	12.07	15 55	8,550	550,000	.....
Yellow poplar	476,000	10.45	43 34	20,630	175,000	301,000
Shortleaf pine	350,000	7.68	29 44	10,305	.....	350,000
White oak	299,700	6.58	54 39	16,301	237,700	62,000
White pine	274,500	6.02	26 25	7,205	245,500	29,000
Ash	268,000	5.88	51 42	13,780	166,000	102,000
Elm	267,000	5.86	29 76	7,945	234,000	33,000
Basswood	260,500	5.72	26 72	6,960	210,500	50,000
Red oak	256,500	5.63	52 18	13,383	194,500	62,000
Spruce	208,200	4.57	28 19	5,870	95,200	113,000
Longleaf pine	176,700	3.88	36 32	6,417	.....	176,700
Silver maple	167,000	3.67	35 00	5,845	134,000	33,000
Cypress (bald)	155,000	3.40	59 77	9,265	.....	155,000
Loblolly pine	99,000	2.17	20 80	2,049	.....	99,000
Hickory	85,000	1.87	35 59	3,025	77,500	7,500
Beech	61,000	1.34	18 92	1,154	57,000	4,000
Cherry (black)	4,500	.10	29 33	132	4,000	500
Birch	3,000	.07	48 33	145	3,000	.....
Cottonwood	1,000	.02	70 00	70	.....	1,000
Total	4,555,900	100.00	$34 37	$156,568	2,884,000	1,671,900

SPORTING AND ATHLETIC GOODS.

About twenty firms are engaged in the manufacture of sporting and athletic goods in the State. The title of this industry covers a very broad range of manufacture, ranging from baseball bats, billiard and pool tables to tennis rackets, golf clubs, and fishing rods. In New York, however, the consumption of wood in large quantities is limited to a few branches of the industry.

Billiard and pool tables consume the largest amount and the greatest variety of woods. The greater portion of the white oak and nearly all the red oak goes into billiard and pool table racks. Cushion rails, some of which are veneered, are made of oak, ash, and other good hardwoods. Rosewood contributes to the exterior finish. Sugar maple, yellow poplar and white pine are also used in one way or another.

Bowling alleys consume more shortleaf pine than all other branches of the industry combined. In fact, practically all of the shortleaf yellow pine reported is used in the manufacture of bowling alleys. Nearly 200,000 feet of sugar maple goes into bowling alleys, while practically all of the hemlock, spruce, and longleaf pine also go into bowling alleys and equipment such as refrigerators.

Athletic goods, while consuming a great variety of woods in the aggregate, really specialize very greatly in their selection of woods. And nowhere else do the general qualities of woods single them out

for particular use more pre-eminently than in certain branches of the trade. For example, baseball bats are made almost entirely of ash, this product consuming approximately 90 per cent of the raw material reported, a few thousand feet of white oak being reported, along with ash for the production of baseball bats. Tenpins is another article that depends entirely upon a single wood, that of sugar maple, and over 500,000 feet of this species is so used. Sugar maple is strong, tough and extremely difficult to burst or splinter and no other wood has been found so suitable for the severe service of a tenpin.

Fishing line blocks utilize much of the basswood, while skate rolls call for most of the beech.

Sugar maple also is a favorite billiard cue material, and the finer woods, black walnut, ebony, Circassian walnut, and rosewood, are used for decorative parts of this article.

Bowling balls, like tenpins, must be made of extremely dense, tough woods. Lignum-vitae is acknowledged to be the only wooden material suitable. Composition balls share the market with lignum-vitae, but no other wood is desirable. Slate frames, general inside framework of billiard and pool tables utilize elm, chestnut, basswood, white pine, spruce, and yellow poplar. Pool and billiard equipment, such as ball racks, call for high grade quarter-sawed white oak.

The 4,230,100 feet reported cost the manufacturers $258,203, or $61.04 per thousand f. o. b. factory. Lignum-vitae, mahogany, Circassian walnut, teak, are high priced woods costing $200 per thousand; while beech at $14.50 per thousand is the cheapest wood going into the industry.

TABLE 30.— SPORTING AND ATHLETIC GOODS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Sugar maple	851,000	20.12	$41 02	$34,904	274,000	577,000
White oak	714,000	16.88	65 78	46,964	213,000	501,000
Shortleaf pine	592,000	13.99	37 75	22,348	.....	592,000
Red oak	525,000	12.41	69 05	36,250	25,000	500,000
Yellow poplar	351,200	8.30	58 66	20,602	300,000	51,200
Lignum-vitae	225,000	5.32	200 00	45,000	.....	225,000
Ebony	189,000	4.47	75 00	14,175	.....	189,000
Hemlock	180,600	4.27	17 50	3,160	180,600	.....
Spruce	172,800	4.09	22 07	3,813	172,800	.....
Beech	100,000	2.36	14 50	1,450	100,000	.....
Ash	61,000	1.44	26 48	1,615	61,000	.....
Basswood	60,600	1.43	36 37	2,204	12,000	48,600
White pine	51,500	1.22	41 17	2,120	50,000	1,500
Mahogany	50,000	1.18	200 00	10,000	.....	50,000
Circassian walnut	25,000	.59	200 00	5,000	.....	25,000
Rosewood	24,400	.58	170 00	4,148	.....	24,400
Chestnut	17,000	.40	45 29	770	10,000	7,000
Longleaf pine	15,000	.35	42 00	630	.....	15,000
Teak	10,000	.24	200 00	2,000	.....	10,000
Black walnut	10,000	.24	90 00	900	.....	10,000
Elm	5,000	.12	30 00	150	5,000	.....
Total	4,230,100	100.00	$61 04	$258,203	1,403,400	2,826,700

TRUNKS AND VALISES.

New York is important in the manufacture of trunks, her consumption of 3,536,000 feet b. m. placing the State in the front rank, although greatly overshadowed in this industry by Michigan, with a total consumption of over 14,000,000 feet. Missouri consumes 4,364,000 annually. While in New York basswood, yellow pine and elm supply nearly 95 per cent of the raw material, in Michigan hemlock and sugar maple contribute over 80 per cent, and in Missouri cypress is the leading trunk wood. In New York the principal centers of manufacture are Binghamton, Buffalo, Rochester, Utica and New York. In New York the trunk slats are made of white elm, hickory and white ash; the backs are made of basswood, white pine and red gum; white elm, white ash and hickory supply the clips and cleats, while basswood is the chief material for trays. Most of the body of the trunk is made of wood, but very little is visible except the strengthening slats, which are placed transversely or longitudinally to brace the body. These slats are preferably made of elm and white ash because these woods are strong, elastic and not easily split. The body of the trunk, the tray and partitions should be the lightest woods that possess in a moderate degree the qualities of toughness, strength and elasticity. Many woods that possess these qualities are apt to warp greatly, a very objectionable

quality in trunk lumber. Basswood is preferred by New York manufacturers for the manufacture of family trunks. The wood is not strong enough for the heavy sample cases used by drummers. These are usually made of built-up wood with the grain alternately crossed and firmly glued. Originally white pine and basswood were the principal woods used by trunk manufacturers, but lately they have tried yellow poplar, cottonwood, cypress, and other similar woods. Manufacturers are now having difficulty in getting poplar and cottonwood of proper dimensions, while basswood is becoming very hard to get. Several of the manufacturers are experimenting with gum and tupelo, but their tendency to warp is discouraging in this industry. Over 50 per cent of the raw material used by New York State factories is homegrown and this accounts for the reasonable average price of $33.21 per M feet f. o. b. factory.

TABLE 31.— TRUNKS AND VALISES.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Basswood	2,260,500	63.93	$33 32	$75,325	1,085,500	1,175,000
White pine	750,000	21.22	29 21	21,925	75,500	675,000
Elm	340,000	9.62	34 41	11,700	50,000	290,000
Hickory	80,000	2.26	47 50	3,800	.....	80,000
Ash	70,000	1.98	50 00	3,500	.....	70,000
Red gum	35,000	.99	33 57	1,175	.....	35,000
Total	3,536,000	100.00	$33 21	$117,425	1,211,000	2,325,000

PATTERNS AND FLASKS.

Table 32 includes general flask patterns, foundry patterns, hat blocks, machine shop patterns and models. The industries reporting the data include agricultural implement plans, iron working establishments, railroad shops, locomotive works, electric power companies and general manufacturing establishments. A few firms are engaged exclusively in the manufacture of patterns, hat blocks and flanges for hat blocks, while other establishments have pattern departments for the exclusive use of their own plants. General foundries and railroad shops have their own pattern department. Much of the raw material consumed, however, is reported by general manufacturing establishments that have no pattern departments in the strict meaning of the term.

Pattern makers need a soft, workable wood for forms such as hat blocks, pressing blocks, and generally demand a high-grade stock of yellow poplar, basswood or white pine. Foundry and machine shops

need woods that have the greatest capacity to resist fire, and redwood is imported from California because it can withstand the severe test of being in contact with hot sand and molten metal without ignition. White pine contributes over 85 per cent of the raw material consumed in this industry and its average price f. o. b. factory is $51.58. It is used in every kind of establishment reporting and cannot be identified as particularly preferred as a pattern wood for any special kind of articles. Yellow poplar, however, one of the highest priced woods, is especially suitable for hat blocks. Many inferior woods are reported, such as pitch pine, chestnut and hemlock, but they are used for the roughest work in connection with general foundry and machine shop form work. White oak and basswood are next in importance to white pine and are used largely for brick molds and forms for parts of road rolling machines.

White oak is used for all kinds of patterns and models because of its capacity to resist the wearing action of sand. The stock required for patterns is usually plain, rough, clear 1 to 2 inches thick, while the models demand a clear surfaced stock ¼ to 4 inches thick. There is comparatively little waste in the industry because dimensions include very short lengths. Very little effort is made to utilize waste but a few firms report by-products from sawdust of high-grade woods, such as floor preparation, wash trays, washboards, etc.

Eighteen woods are listed and their total consumption amounts to 3,388,300 feet b. m., the average cost f. o. b. being $49.43.

TABLE 32.— PATTERNS AND FLASKS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
White pine	2,908,400	85.84	$51 58	$150,002	681,800	2,226,600
Basswood	105,500	3.12	34 47	3,637	105,500	.....
White oak	100,000	2.95	35 00	3,500	100,000	.....
Hemlock	75,800	2.24	15 87	1,203	15,800	60,000
Pitch pine	60,000	1.77	24 33	1,460	60,000	.....
Ash	25,000	.74	25 00	625	25,000	.....
Shortleaf pine	24,000	.71	26 63	639	.....	24,000
Mahogany	21,050	.62	16 78	3,532	.....	21,050
Chestnut	20,000	.59	25 90	518	.....	20,000
Spruce	15,000	.44	24 67	370	.....	15,000
Sugar maple	15,000	.44	36 93	554	15,000	.....
Yellow poplar	8,350	.25	100 00	835	.....	8,350
Red oak	3,000	.09	55 00	165	.....	3,000
Redwood	2,700	.08	65 00	176	.....	2,700
Cherry (black)	2,500	.07	87 60	218	500	2,000
Birch	1,000	.03	30 00	30	1,000	.....
Beech	500	.01	30 00	15	500	.....
Locust	500	.01	40 00	20	500	.....
Total	3,388,300	100.00	$49 43	$167,499	1,005,600	2,382,700

Toys.

Toys may be divided into a dozen general classes as follows: Amusement, architectural, educational, games, household furniture, kitchen, musical, natural history, trade, wagons and sleds, watercraft and wheelbarrows. The industry has been slow to develop in the United States because much of the work has been done by hand in years past and America did not have the skilled workmen, and also because German manufacturers in the vicinity of Nuremburg had an advantage over the American employer in that they could employ German peasants who worked in their homes for almost nothing, thus enabling the German manufacturers to quote prices far below the cost of production in this country. With the advent of improved machinery, however, New York manufacturers found a field of good business venture along certain lines. Germany still supplies the world with certain classes of toys, but New York has active successful establishments producing toy blocks, dominoes, checkers, handsleds, children's wagons, doll carriages, coasters, toy shovels, carriages, etc. Our local factories, it will be noted, produce articles that are largely made of hardwoods and from raw material that comes in the form of lumber or small, sound strips. Much of our product may be made from the waste of certain larger industries such as that from furniture factories. Some other classes of wood users report the sale of small dimension waste to toy manufactures, while others utilize their own waste by manufacturing toys. One or more manufacturers of piano actions, for example, report the use of a large amount of birch and basswood waste for toys and games. Thus the toy industry is a natural by-product of wood-using industries and should become of great importance in New York, where our wood-using industries are so very important and where the problems of closer utilization are becoming of great interest. With modern machinery and raw material in great abundance that is now practically waste, New York wood users should make a close study of the opportunities afforded in this large and growing field of manufacture. Paris supplies many of the metal toys, Germany and other nations do much hand work, but there is an excellent field here for profit in closer utilization of wood waste.

Table 34 lists ten hardwoods, all of which may be obtained in abundance in New York, but one of which was purchased from outside the State entirely, yellow poplar having been shipped in from West Virginia. Hardwood toys have gained in importance of late years in response to the demand for more durable and substantial playthings. The species used must have the general qualities of being easily worked and of being tough. Much of the economy of utilization consists of preparing the stock in dimensions so that the machines, lathes, swing-cut-off saws, ripsaws, etc., may work on standard lines and on pieces of wood that will turn out toys that are designed to utilize every inch of the wood. Toy blocks are perhaps the most

perfect utilization, especially where a thin board is made into puzzles, and there is no loss of wood except the kerf loss of a very thin saw. Wood users could hope for no closer utilization than toys.

Table 33 shows the consumption of nearly 3,000,000 feet, approximately three-fourths of which is basswood and sugar maple. The principal product is children's wagons and carts, in which basswood forms largely the bottoms, while sugar maple contributes the seats and sides. In this branch almost all of the woods take part, red and white oak going into axles, spokes and rims, ash into spokes and frames, chestnut into sled tops, elm into frames. Dominoes and checkers consume 400,000 feet of sugar maple and basswood, one firm using basswood only for dominoes. Toy blocks consume over 750,000 feet of basswood and a small amount of yellow poplar. Much of the birch used is paper birch and goes with basswood into toys and games. Toy snow shovels, in imitation of the man's working implement, utilize mainly white ash, just as do the large hoe and fork handle plants. A small amount of yellow poplar is also used in these manufactures.

The average price of the raw material is $27.36, or about $3 per thousand less than the average cost of all woods consumed by the wood-using industries of New York.

TABLE 33.— TOYS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Basswood	1,412,500	47.17	$31 41	$44,370	762,500	650,000
Sugar maple	960,500	32.08	23 12	22,210	710,500	250,000
Ash	232,000	7.75	25 78	5,980	212,000	20,000
Chestnut	125,000	4.17	21 80	2,725	100,000	25,000
Birch	100,000	3.34	20 00	2,000	50,000	50,000
Red oak	100,000	3.34	30 00	3,000	100,000	.....
Yellow poplar	38,000	1.27	28 63	1,088	.....	38,000
Elm	15,500	.52	23 23	360	15,500	.....
Butternut	10,000	.33	18 00	180	10,000	.....
White oak	1,000	.03	19 00	19	1,000	.....
Total	2,994,500	100.00	$27 36	$81,932	1,961,500	1,033,000

CLOCKS.

The clock industry in New York is very important compared with this industry in other states. Probably Connecticut is rightly accredited with the production of more wooden clocks than any other state, its Wood Using Report showing a total consumption of 4,761,000 feet. New York ranks second with almost 3,000,000 feet. Considering the comparatively small amount of wood used in this indus-

try, a large variety of woods is consumed. When the substitution of metals became general in this manufacturing industry many years ago the use of wood was almost discontinued. Recently, however, clock cases of wood have become stylish and the substitution of wood for the imitation marble and metal ones has become quite general in certain lines, such as the "grandfather" variety and the "bracket" clocks or those which are attached to the wall. Clock cases now are fine examples of the cabinet maker's art. The decorations are of a very delicate character, showing beautiful filigree work, fine scrolls and figures of leaves, flowers and animals. The industry is not exacting in its demands for any particular species, but the quality of being easily worked is generally required by the trade for the "turnery" part of the cases. Products referred to in the table included not only the costly clock cases, but rough shipping cases as well. The latter class accounts for the large amount of pine reported. Certain species such as black walnut, mahogany, cherry and gum are used only for the exterior or decorative part of the cases. Birch is especially recommended for the turnery parts of cases. Beech is reported for the embossing parts, while the oaks are used for the cases as well as the frames. Frequently finely-figured wood is used to veneer the whole surface of the clock case. Small circular saws are generally utilized for the production of pieces used in enamel work and for this purpose the cheaper woods, such as pine, can be used as in the hidden work. Bottoms are made of good pine, which is considered better than mahogany and other hardwoods because the softwood bottom improves the tone of the striker, which is fastened to the bottom part. Wooden clocks are now important decorative pieces of furniture in households and in offices. The industry is becoming of importance to artistic cabinet makers who can obtain good remuneration for the display of their talents. Mahogany costs the manufacturer $104.77, but the average cost of woods for this high class product is only $31.93.

TABLE 34.— CLOCKS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Loblolly pine	926,571	31.43	$19 50	$18,068	.....	926 571
White oak	711,227	24.12	42 42	30,167	161,227	550,000
White pine	456,064	15.47	34 10	15,552	.....	456,064
Cotton gum	322,816	10.95	34 15	11,024	.....	322,816
Cherry (black)	300,000	10.17	30 00	9,000	.....	300,000
Red oak	150,000	5.09	30 00	4,500	.....	150,000
Black walnut	28,527	.97	70 00	1,997	.....	28,527
Mahogany	28,196	.96	104 77	2,954	.....	28,196
Basswood	10,000	.34	30 00	300	10,000	.....
Beech	9,714	.33	30 47	296	.....	9,714
Birch	5,044	.17	55 71	281	.....	5,044
Total	2,948,159	100.00	$31 93	$94,139	171,227	2,776,932

ELEVATORS.

The products here referred to include elevators and elevator parts, including gates, dumbwaiter cars, platforms, guides and frames. Much of the material is manufactured by city planing mills and is reported under the head of general millwork, so that the 2,663,000 feet given for elevator manufacture is considerably less than the real consumption in the State by this industry. The pines contribute over 50 per cent of the wood consumed by the elevator industry, generally being made into guides, car frames, platforms and parts where great strength is not essential. Oaks contribute the next largest amount and go to make the posts, strength being the essential requirement for this use. Maple is used principally for flooring in cars and for elevator guides. It is also used, along with ash, birch, basswood and shortleaf pine, for dumbwaiter cars. Ash and oak are especially useful because of their strength and toughness, and form the structural framework and heavy platforms of freight and passenger elevators. Dumbwaiters are of entirely different material and the lighter, softer woods that are usually worked are especially desirable for such parts. Sugar maple forms the flooring of platforms, where its hardness and durability commends it for such use. Yellow poplar, which is capable of taking a very high polish, generally goes into elevator finish.

TABLE 35.— ELEVATORS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Pitch pine	1,234,000	46.33	$22 41	$27,648	.....	1,234,000
White oak	530,000	19.90	39 39	20,875	175,000	355,000
Sugar maple	398,000	14.94	43 15	17,172	398,000	.....
Red oak	150,000	5.63	40 00	6,000	50,000	100,000
White pine	127,500	4.79	33 76	4,305	10,000	117,500
Shortleaf pine	92,500	3.47	24 95	2,308	.....	92,500
Silver maple	30,000	1.13	24 00	720	30,000	.....
Longleaf pine	24,000	.90	40 00	960	.....	24,000
Spruce	24,000	.90	37 00	888	.....	24,000
Birch	22,000	.83	33 41	735	22,000	.....
Ash	16,200	.61	37 47	607	3,000	13,200
Basswood	10,000	.38	28 00	280	10,000	.....
Yellow poplar	5,000	.19	45 00	225	.....	5,000
Total	2,663,200	100.00	$31 06	$82,723	698,000	1,965,200

WHIPS, CANES, UMBRELLA STICKS.

The State of New York uses a great variety of woods for canes, whips and umbrella stock. Styles vary, but at no time can the trade be satisfied with a few species of woods. The bugaboo of substitution has never disturbed the cane makers. Woods may come and woods may go but it will always be wood. At present probably the most fashionable cane wood is Malacca. This rare cane, nicely tapered and with crooked handle, may sell as high as $125, while a comparatively simple design may sell for $50. A cane expert says that Malacca stock comes not from Malacca but from Siak on the opposite coast of Sumatra. The tree contributing the cane wood is a slender climbing palm known as *Calamus scipionum* and the piece that is essential is found between the joints of the palm stock. So rare is the perfect stick that in order to find one measuring forty inches between joints, from 50,000 to 100,000 sticks must be sorted. The ordinary Malacca or other jointed stick is made by cutting off the required length for a cane, joints and all, sandpapering and then painting it in imitation of the perfect stick. Many foreign and some native sticks reach New York factories rather in form of nursery stock, root and stem. The stock is bought by the ton and so mixed that costs by species can scarcely be reliably estimated. In New York the straight stock is steamed and skillfully hand-bent in a vise into any desired hook or crook. The skilled mechanic's art of bending and decoration is not generally known by the public. The crooked sticks are straightened by burying them in hot sand over a stove until they become pliable. Adjoining the sand is a strong board

with a notched edge. When the stick has become pliable through heating, the mechanic places it in a notch and works out a perfectly straight stick. The well-trained eye alone can produce a straight stick from what otherwise is a tangled, worthless, twisted shrub. Umbrella handles utilize waste from cane stock and thus the two industries are frequently combined. Several woods, however, such as mahogany and ebony, are used for umbrella handles and not for walking sticks. Beech contributes over 90 per cent of the wood reported in Table 36, and it goes almost exclusively into whip stock. Beech is elastic, easily worked, does not check or warp badly, is moderately strong and makes splendid whip stocks and umbrella sticks. Its abundance and cheapness ($23.16 f. o. b. factory) commend it above other superior but more expensive woods like sugar maple and birch. New York State forests alone contribute this important species to these industries. Bamboo is contributed by China and Japan, partridge wood comes from South America, Malacca from Southern Asia, Whanges from Japan, rattan and others from the Singapore area of China. The ebonies make choice handles and are cut from solid deals or blocks. Furze, a common British plant, also known as whin or gorse, is very irregular in growth, but when properly dressed and straightened it makes extremely pretty walking and umbrella sticks and is in great demand. The low average price of $28.33 for this industry does not take into consideration the cost of many foreign woods that are bought by the ton or in the piece, per hundred, or per gross. A fair average annual price paid for a few imported woods is about as follows: boxwood pieces, for umbrella handles, $3 per gross; congo pieces for umbrella handles, $1.60 per gross; ebony for umbrella handles, $65 to $90 per ton; boxwood logs for handle or other similar stock — West Indian, $18 to $20, and Turkish from $130 to $175 per ton.

TABLE 36.—WHIPS, CANES, UMBRELLA STICKS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Beech	2,035,000	90.97	$23 16	$47,125	2,000,000	35,000
Hickory	40,000	1.79	49 50	1,980	.....	40,000
Ash	30,000	1.35	60 00	1,800	.....	30,000
Birch	25,000	1.12	50 00	1,250	.....	25,000
Basswood	20,000	.89	40 00	800	.....	20,000
Sugar maple	20,000	.89	50 00	1,000	.....	20,000
Black walnut	20,000	.89	51 00	1,020	.....	20,000
White oak	20,000	.89	65 00	1,300	.....	20,000
Mahogany	15,000	.67	300 00	4,500	.....	15,000
Ebony	10,000	.45	250 00	2,500	.....	10,000
Red cedar	2,000	.09	50 00	100	.....	2,000
Total	2,237,000	100.00	$28 33	$63,375	2,000,000	237,000

Woods bought by piece or weight:

Bamboo	Hornbeam	Partridge	Scotch thistle
Congo	Lancewood	Pea	Weitzel
Corra	Malacca	Peach	Whangee
Furze	Orange	Rattan	Willow (osier)
Haw			

PLUMBERS' WOODWORK.

A few firms specialize in the production of woodwork for the plumbing industry in the State. The industry includes bath tubs, toilet tanks, seats, wash tray frames, bath room cabinets and general plumbers' equipments. Formerly the bath tub was the principal wooden article manufactured, but with the advent of the more sanitary metal substitute for bath tub material there was a net loss in the total consumption of wood. At present only the rims of bath tubs are of wood. Other articles, such as toilet tanks, grew in importance and the utilization of wood in this class of goods still makes the industry a factor in the sales of high grade oaks. White and red oak contribute nearly three-quarters of the raw material and together with birch, the latter often being stained in imitation of mahogany, supply the closet toilet seats and fronts or visible parts of the tanks. Ash is a favorite wood for washtray rims or frames. Chestnut and shortleaf pine are reported for use as backs for tanks. Yellow poplar and sugar maple are used extensively for bath room cabinets and minor equipments.

Since the woodwork is relatively a very minor item in the plumbing industry in New York, the 1,787,000 feet reported is indicative of a very large manufacturing business in the State. The average cost of $37.34 per thousand feet for the raw material used by this class of manufacturers is about $6.50 per thousand above the general average

for all industries. Any one firm, no matter how large, is scarcely justified in obtaining the raw material in large quantities and most all of the stock is purchased from wholesale dealers in the larger centers, who have to select good, clear stock and charge somewhat extra for the culling process necessary to oblige plumbing establishments.

TABLE 37.— PLUMBER'S WOODWORK.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
White oak	690,000	38.61	$37 83	$26,100	375,000	315,000
Red oak	518,000	28.99	35 07	18,165	233,000	285,000
Birch	216,000	12.09	45 58	9,845	141,000	75,000
Shortleaf pine	200,000	11.19	28 75	5,750	.....	200,000
Ash	96,000	5.37	33 54	3,220	90,000	6,000
Sugar maple	56,000	3.13	50 00	2,800	31,000	25,000
Yellow poplar	10,000	.56	80 00	800	.....	10,000
Chestnut	1,000	.06	50 00	50	.....	1,000
Total	1,787,000	100.00	$37 34	$66,730	870,000	917,000

PRINTING MATERIAL.

While this industry is comparatively unimportant from the standpoint of amount of wood consumed in the State, the total of 1,737,000 board feet consumed annually for the small articles manufactured shows that New York is extremely important among the States in the printing and publishing business. The figures in Table 39 account for the lumber going only into minor articles, such as engraving blocks, electrotype blocks, engraving boards and printing press attachments. Hickory and chestnut are used for "shooflies," a device with long fingers for freeing the sheets of paper from cylinder presses. Engravers' blocks and electrotype blocks and bases are generally made of cherry, basswood, white oak, birch, maple and beech. The small amount of mahogany reported goes into engraving blocks. Nearly all of the basswood is used for engraving boards. The essentials of woods for the engraving and electrotyping industry include the qualities of being free from warping and of being hard and capable of holding nails without splitting.

TABLE 38.— PRINTING MATERIAL.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Cherry (black)	577,000	33.21	$48 28	$27,850	27,000	550,000
Basswood	290,500	16.72	30 00	8,715	290,500	.....
Chestnut	250,000	14.39	18 00	4,500	250,000	.....
Shortleaf pine	200,000	11.51	15 00	3,000	.....	200,000
White oak	200,000	11.51	40 00	8,000	.....	200,000
Birch	100,000	5.75	42 00	4,200	.....	100,000
Sugar maple	50,000	2.88	45 00	2,250	.....	50,000
Beech	25,000	1.44	35 00	875	25,000	.....
Mahogany	25,000	1.44	225 00	5,625	.....	25,000
Hickory	20,000	1.15	30 00	600	20,000	.....
Total	1,737,500	100.00	$37 76	$65,615	612,500	1,125,000

SHADE AND MAP ROLLERS.

Table 39 refers to curtain poles, rug poles, map rollers and shade rollers, the consumption for such articles being 1,622,500 feet annually.

The manufacture of shade rollers is a specialty line. Several firms are engaged exclusively in the production of this article and practically all of the million feet of white pine reported is used by such establishments. Some plants are equipped only to manufacture shade roller blanks, bored and fitted to receive the spring. The dimensions of shade rollers used in large quantities are 15/16 inch in diameter and 36¼" to 42" in length, bored on one end to a depth of nine inches to receive the spring and chamfered on the same end to receive the ferrule. The raw material is largely shipped in from Canada and is well seasoned and kiln-dried white pine. Some of the rollers are made of two pieces and joined together with a plug splice, which is, of course, glued. Local manufacturers report a scarcity of suitable clear stock and some are now seeking a product of native pine. There is no reason why the clear, soft, light, white, non-resinous, workable white pine of New York State forests should not supply all the needs of local factories, it only being necessary to properly advertise the wants of the establishments. The hardwoods contribute the raw material for the curtain poles and trimming. Red gum is used exclusively for curtain poles and trimmings, while basswood is used only for rug poles. Beech, ash and sugar maple contribute to the production of both curtain and rug poles. Rug poles are the rougher products in the industry and this accounts for the low average price of $16 paid for beech, the principal raw material going into this article.

TABLE 39.— SHADE AND MAP ROLLERS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
White pine	1,000,000	61.63	$42 50	$42,500	125,000	875,000
Red gum	500,000	30.82	25 60	12,800	.....	500,000
Beech	50,000	3.08	16 00	800	50,000	.....
White ash	45,000	2.77	35 00	1,575	45,000	.....
Basswood	15,000	.93	18 00	270	15,000	.....
Sugar maple	12,500	.77	20 40	255	12,500	.....
Total	1,622,500	100.00	$35 88	$58,200	247,500	1,375,000

BRUSHES AND BROOMS.

Table 40 includes brush backs, small brush and duster handles and broom splints. The figures are separate from those showing the production of general handles, the latter being a very large industry in the State. Most of the products of the following table are small articles used in the household and for the care of the person. An exception is in the broom splint, which is a long, thin sliver of wood used for sweeping. Backs of hand mirrors form part of the industry, although the larger mirror backs, made of cheaper woods, are reported under picture frames and mouldings. The backs of hand mirrors are of high grade stock similar to the stock used for brushes. Both the mirrors and brushes are often real works of art, turned from ebony, mahogany, rosewood, maple, cherry, walnut and birch and are very ornamental, being turned into varied forms. Over one-third of the raw material is beech, which is particularly recommended for backs of scrub brushes and stable brooms. Beech is also used for whitewash and kalsomine brushes. Paint brush blocks are made of maple, beech and birch, named in the order of their importance. Wood for brushes must be very strong and tough and have the capacity to resist splitting when nailed or bored. The woods are used interchangeably in the production of so many of the articles reported that no conclusion can be drawn relative to the special qualities demanded for many of the uses. Hard maple, however, while used for all of the articles, is the only one reported for the production of broom splints. Duster handles consume hard maple, beech, birch and cherry. Generally speaking, beech, basswood, and white pine go only into the rougher, unpolished handles, while the others are used in the manufacture of ornamental or high grade articles.

The low average cost of $24.40 for the 1,562,500 feet consumed is the result of the large amount of woods going into the rougher articles such as broom splints. Of the fifteen kinds of wood reported, 8 species cost the manufacturers $30 and upward per thousand, while rosewood, ebony and mahogany range in price from $200 to $266.67.

TABLE 40— BRUSHES AND BROOMS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Beech	565,000	36.16	$20 33	$11,485	460,000	105,000
Birch	463,000	29.63	19 26	8,916	293,000	170,000
Sugar maple	201,500	12.89	27 30	5,500	166,500	35,000
Basswood	138,000	8.83	20 29	2,800	138,000	.....
White pine	75,000	4.80	18 00	1,350	75,000	.....
Elm	50,000	3.20	25 00	1,250	30,000	20,000
Red gum	30,000	1.92	30 00	900	.....	30,000
Mahogany	15,000	.96	266 67	4,000	.....	15,000
Yellow poplar	10,600	.68	31 89	338	600	10,000
Ebony	5,000	.32	250 00	1,250	.....	5,000
Silver maple	5,000	.32	24 00	120	5,000	.....
Cherry (black)	2,000	.13	30 00	60	2,000	.....
Chestnut	1,500	.10	55 00	83	1,500	.....
Black walnut	600	.04	30 00	18	600	.....
Rosewood	300	.02	200 00	60	.....	300
Total	1,562,500	100 00	$24 40	$38,130	1,172,200	390,300

SHUTTLES, SPOOLS, AND BOBBINS.

It is not generally known that New York is an important contributor to the production of spools, bobbins, and spindle stock. Her factories consume nearly 1,000,000 feet of birch, yellow poplar, beech, cottonwood, and cherry annually, and pay over $20,000 for their raw material. The industry in this State does not include shuttle blocks, which explains the absence of the prime shuttle block woods, persimmon and dogwood.

Bobbins are reels used to hold yarn or thread, having a hole bored through their length by which they may be placed on a pivot and used on spinning or warping machines. The rough stock is generally small dimension squares of birch, beech, and sugar maple.

The manufacture of spools is more peculiarly a New England industry, and is centered in Maine. Spool factories of that State turn out nearly one billion spools annually. A comparison shows New York to be relatively unimportant at present, but the industry is growing rapidly and will doubtless become important. White birch of the best quality is used almost exclusively. It reaches the factories in the form of bars from ½" to 2-9/16" square, and from 2½ feet to 4 feet long, and these bars must be clear stock, free from all defects. The birch is cut in winter and sawed by small portable mills which operate along the railroad lines. One thousand feet of bars consume about two and one-half cords of wood. The portable mills pile the bars criss-cross for thorough seasoning. In June the stock is ready for shipment to factories. The machines for making spools are complicated. The finished article drops from the lathe

Photo by Hugh P. Baker.

BEST TYPE OF VIRGIN FOREST IN THE CENTRAL APPALACHIAN REGION.
Mixed evergreens and hardwoods. Unusually fine specimen of Cucumber tree in middle ground.

at the rate of one per second and are perfectly uniform and true. Finished spools are marketed largely in Rhode Island, Connecticut, New York, and New Jersey, while the spool bars are largely exported to England and Scotland.

Birch contributes over 50 per cent of the raw material. Beech is the next most important species and is used entirely in the production of bobbins. Sugar maple follows beech closely and is used largely for spool middles or "barrels". Yellow poplar goes to make spool heads, along with paper birch. The small amount of cherry reported is used for bobbins; cottonwood is reported as going into general spindle stock. The average price paid for the raw material is $21.02. New York has an abundance of raw material suitable for the production of spools and bobbins, and her mills should greatly increase their output of this stock during the next few years.

TABLE 41.— SHUTTLES, SPOOLS, AND BOBBINS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Birch	552,000	57.38	$20 92	$11,550	452,000	100,000
Beech	200,000	20.79	16 00	3,200	200,000	.....
Sugar maple	150,000	15.59	25 00	3,750	80,000	70,000
Yellow poplar	50,000	5.20	30 00	1,500	.....	50,000
Cherry (black)	5,000	.52	25_00	125	5,000	.....
Cottonwood	5,000	.52	20 00	100	5,000	.....
Total	962,000	100.00	$21 02	$20,225	742,000	220,000

PULLEYS AND CONVEYORS.

There are so many different kinds of pulleys and conveyors that a detailed discussion is impracticable in a report of this kind. Table 42 contains the data relative to two rather distinct classes of articles, the one having to do with the amount of wood consumed for the conveyance of belting, while the second class of data shows the amount consumed in the manufacture of "tackle blocks" or tackle block shells used for construction purposes.

Pulleys were formerly very crude articles consisting of rough boards nailed and glued together. With the development of modern mechanical perfection, great ingenuity was brought to bear on this branch of mechanics and several factories sprang up to put improved wood pulleys on the market. It required much time to properly construct them and for a time iron made great inroads as a substitute. Good dry kilns, modern wood working machinery and special lathes developed the modern wood pulley, with interchangeable bushings. It has certain advantages generally recognized. The

wood is much lighter than iron, much less apt to break through high-speed centrifugal force, it does much less injury in the event of a break of a large fly-wheel and complies with the insurance and accident regulations of many States. On the other hand, the iron pulley has some advantages, one of them being that it does not warp nor twist so much as wood in outdoor places and where exposed to extreme moisture. The general class of pulleys and conveyors consist of the larger fly-wheels in factory work and what is known as "cone pulleys" or graduated steps or blocks on which the smaller leather belts are carried. For the great fly-wheels, some of which are 30 feet in diameter and have a 9-foot face, the rim is 12 inches or more thick and consists generally of ash plank thoroughly kiln-dried; the built-up stock consisting of as much as 8 courses of 4-inch stock and 7 courses of 2-inch and the remainder of 3-inch stock, all being reduced ½ inch in dressing. One large fly-wheel reported has 44 courses in all, each ring being made of 12 pieces and each course dressed to exact thickness on the buzz planer and then thoroughly glued in place and fastened with 3-inch leg bolts. The next step is to drive well fitted hardwood edges between the butts. When completed the wheel may be run up to a speed of 76 revolutions per minute without exhibiting even a hair crack on the varnish on the inside of the rim, thus showing the great capacity of built-up wood to resist injury through extreme velocity in revolution. Such a large wheel at 76 revolutions has a surface speed of nearly 7,200 feet per minute. A well known mechanical engineer reports that there are many thousands of iron pulleys of all sizes, but no cast iron pulleys are used for belt speed in excess of 3,000 feet per minute.

Cone pulleys to be really strong and serviceable need to be "built-up" also, on a regular raceplate and of very thin material. The article thus produced is non-shrinkable and destined to stand the wear and tear of many years. The smaller ones generally consist of at least six segments. Ordinary pine may be used because it takes glue well and holds nails without splitting, but in New York hardwoods are preferred. Lignum-vitae and maple will stand indefinitely the severe wear and tear of the industry. Tackle block shells form a large part of the raw material in this industry. They are the hol low forms into which metal strips and rollers are placed for lifting material, their great usefulness consisting of their capacity to multiply pulling power of machinery and animals. Metal has been used extensively for the smaller block shells, but in the larger complicated tackle blocks metal is entirely too heavy. Wood is generally recognized as the most satisfactory tackle block shell.

Sugar (or hard) maple supplies approximately one-half of the 823,000 feet of wood reported for the manufacture of pulleys and conveyors. Beech contributes nearly one-fifth and is followed closely by ash. Lignum-vitae is the only foreign wood and perhaps excels al' others because of its density and wearing qualities. Added to

these qualities, lignum-vitae is difficult to split. It is imported in the form of logs from South America, bought by the ton, the average price delivered at New York being about $65 per ton. The small amount of cypress reported was consumed by conveyor boxes. Sugar maple, birch and beech were supplied mainly by the New York State forests and their average cost per M feet at the factory is considerably below that of the imported woods.

TABLE 42.— PULLEYS AND CONVEYORS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Sugar maple	400,000	48.60	$19 75	$7,900	225,000	175,000
Birch	160,000	19.44	40 00	6,400	60,000	100,000
Ash	150,000	18.23	50 00	7,500	.....	150,000
Lignum-vitae	60,000	7.29	250 00	15,000	.....	60,000
Beech	50,000	6.08	25 00	1,250	50,000	.....
Cypress (bald)	3,000	.36	59 00	177	.....	3,000
Total	823,000	100.00	$46 45	$38,227	335,000	488,000

DOWELS.

Dowels are small wooden pins or rods, usually of circular section, used to connect pieces of wood by being sunk in the edges of each to keep them permanently in their proper relative position. They are made of many diameters and various lengths and generally used by chair and furniture makers and door and sash manufacturers. The major portion of dowels go into the manufacture of chairs, but the tops of tables and counters and parts of doors are joined edge to edge by the employment of these dowels or pegs. This method of joining parts is older than the use of iron and copper. The art of manufacturing wooden pins was highly developed many centuries ago. The product today is no more finished than in ancient days, but the introduction of modern machinery has made it possible for one unskilled man in charge of a machine to produce more pins than a large force of skilled workmen who produce the finished article by hand. Dowels are made in long rods and then re-cut to suit the exact use to which they are to be put. Sometimes they are threaded to hold like screws, but instead of being turned into the wood they are driven in like pegs, the threads giving a better hold upon the sides of the auger holes. New York State is one of the most important producers of cooperage stock, and dowels naturally assume importance as an allied trade in the State. Some minor industries such as the production of shipping crates and poultry coops are also important

in the State and consume much of the dowel stock. Some shipping crates are made wholly of these small rods and give great strength to the crate. It is estimated that a good coop or crate made of birch rods is approximately twice as strong and only half as heavy as the small lumber formerly used. Chairs, cribs and small beds consume much dowel stock, generally in the form of ¾-inch diameter. Cooper's pegs, which are included in this industry, are in general use throughout the State and birch is one of the favorite woods for such use, both the paper and yellow birch being available in great quantities. Dowels must be of hardwood, and in New York there is no need to go beyond the borders of the State for the finest of dowel stock. Table 43 shows that only 50,000 feet of the 753,000 feet consumed annually in the State is purchased from outside the State. Birch, beech, basswood, cherry and sugar maple are splendid woods and the forests of New York are well stocked with these species. Several species, including sugar maple, beech and basswood, are so easily obtained in all of the cooperage localities that the cost of dowel stock is extremely low, the highest price for either of these three woods being only $19 per M feet f. o. b. factory. Birch contributes over 72 per cent of the wood used by this industry and the average price is slightly over $40. This high price is due to the fact that much of the birch goes to the factory in dimension stock and only requires the application of the finishing machinery to produce the dowel.

TABLE 43.— DOWELS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Birch	546,000	72.51	$40 04	$21,862	546,000	.....
Beech	181,000	24.04	18 66	3,378	131,000	50,000
Basswood	15,000	1.99	19 00	285	15,000	.....
Cherry (black)	10,000	1.33	35 00	350	10,000	.....
Sugar maple	1,000	.13	16 00	16	1,000	.....
Total	753,000	100.00	$34 38	$25,891	703,000	50,000

GATES AND FENCING.

New York consumes nine kinds of wood and an aggregate of 725,500 feet annually in the production of fence pickets, turnstiles and gates. The data here given exclude all ordinary rough fence material and posts. No doubt the manufacturing business is limited mainly to patented articles. Most of the finished articles are wire. Bald cypress and shortleaf pine are used mainly for the production of "stubs" or braces for keeping the wire in position. Gates, like screen doors, are

becoming standardized and made in wholesale quantities for the jobbing trade. Turnstiles are generally the production of local general mill establishments and are not standardized. The total consumption herein reported may appear very small, but when it is considered that the wooden part of the modern patent fencing is nominal it will be realized how large the industry is in New York. The total consumption of wood for all kinds of fencing probably remains quite stationary in the State. In the early clearing of lands much valuable timber was destroyed. In more recent years no one has used the expensive woods such as black walnut or white ash, while in cities and suburban homes the substitution of wire for wood has become quite general. On the other hand, there has been an increased use of wood along prairie highways because of the need of fence posts, shade and wind breaks. Many fences have been made through the growth of forest trees, such as Osage orange, Lombardy poplar and locust. In some of the favorable areas line fences have been made of fruit trees. There has been a tendency to increase the number of fences in thickly populated areas where the poultry and dairying industries are important. Much of the material reported under this industry comes under that class of fencing.

Bald cypress is the most expensive wood reported, the price of $48 being $18 per M more than white oak, the next highest priced wood. Cypress, even though its cost is high, is favored because of its great capacity to withstand the elements. Its length of life in fencing highly commends it above the less durable woods, the constant replacing of which has been very expensive.

TABLE 44.— GATES AND FENCING.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Shortleaf pine	200,000	27.57	$25 00	$5,000	.....	200,000
White pine	158,500	21.85	25 27	4,005	158,500	.....
Red oak	100,700	13.88	29 92	3,013	700	100,000
Hemlock	100,000	13.78	20 00	2,000	.....	100,000
White oak	100,000	13.78	30 00	3,000	.....	100,000
Spruce	35,000	4.82	28 00	980	.....	35,000
Cypress (bald)	30,000	4.14	48 00	1,440	.....	30,000
Ash	700	.10	18 00	13	700	.....
Hickory	600	.08	18 00	11	600	.....
Total	725,500	100.00	$26 83	$19,462	160,500	565,000

SIGNS AND SUPPLIES.

The articles listed in this industry are ordinary professional display and advertising boards, stretcher strips for oil paintings, window display frames and racks. It does not include bill posting boards, which

are generally made of tongued and grooved flooring material and accounted for under planing mill products. Only 599,500 feet is accounted for, but this quantity represents mainly the purchases reported directly by sign makers and fails to account for much raw material used by carpenters for such purposes. White pine supplies nearly all the raw material which goes into the industry, its general qualities of workableness, freedom from resin, light color, smooth texture and capacity to take paints and oils well recommend it above all other woods for signs. The other woods are used largely for display racks and hanger articles in show windows. Less than 10 per cent of the raw material consumed in Table 45 is home grown.

TABLE 45.— SIGNS AND SUPPLIES.

KIND OF WORK	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
White pine	585,000	97.59	$27 50	$16,085	25,000	560,000
Red oak	5,000	.83	45 00	225	5,000	.....
White oak	5,000	.83	50 00	250	5,000	.....
Redwood	3,000	.50	80 00	240	.....	3,000
Sugar maple	1,500	.25	35 00	53	1,500	.....
Total	599,500	100.00	$28 11	$16,853	36,500	563,000

FIREARMS.

Black walnut is the only wood reported for the production of gunstock. The selection of suitable wood has been carefully considered and American black walnut has always been given preference. Gun parts are made interchangeable. This requires very accurate woodwork. Black walnut is easily worked, moderately light, polishes well, and has a pleasing appearance. The pieces of raw material are at first rough sawed to shape and the ends of grain painted to prevent checking. The stock is then shipped to the factory where it is seasoned for two or more years before passing into the dry kiln. The pieces are next sawn to dimension and prepared for rough-turning. In all, eight operations are required in the factory, including, in addition to these preliminary steps, shaping edges for guide surfaces, routing and chambering, cutting of recesses for attaching the butt swivel-plates, routing out the space for the magazine and trigger guards, and the final hard finishing, polishing, and dipping in linseed oil. It is then ready for the assembling room.

Black walnut stock generally comes from the woodlot areas of the central west, the original heavy stands having long since been cut over for furniture, the demand for the latter use having been extremely heavy when walnut furniture was in style. The walnut lumber cut of

several States, in their order of importance, is Ohio, Indiana, Illinois, Kentucky and Missouri. Age is necessary to give the heartwood its rich color, and small trees are therefore not used. Since only good stock comes from large trees, replanting for this use is impracticable and the wood is becoming extremely scarce, the average cost of $68.65 for firearms being greater than for any other industry except that of cigar boxes, which uses much raw material in the form of thin veneer lumber. In some States other species are reported for gunstock, among them being Circassian walnut, boxwood, and red gum, but American black walnut is almost the universal wood for gunstock.

TABLE 46.— FIREARMS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per M feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Black walnut.....	370,000	100.00	$68 65	$25,400	.....	370,000

PLAYGROUND EQUIPMENT.

The industry of playground equipment is closely associated with that of toys, including such articles as merry-go-rounds, hobby horses for merry-go-rounds, carouselles, lawn swings, swing settees, swing stanchions and porch swings. The industry also includes such articles as athletic platforms, slats, poles and field athletic appliances. Beech leads all woods and is homegrown, the forests of New York contributing all of the 76,000 feet reported. It is moderately strong, elastic, durable and is used principally for swing stanchions, lawn swings and in places where it is subject to constant vibration. Its ability to withstand irregular strains and twists recommends beech to this industry. Longleaf pine is the second wood in importance and is used for platform sills of merry-go-rounds where clear dimension stock of considerable strength is required. Douglas fir and oak also go into sills and framing timbers for merry-go-rounds. Yellow poplar forms the exterior parts and finish of merry-go-rounds and carouselles. Birch, white and red pine and cherry go largely into lawn swings and settees. Black ash is used for porch swings. Sugar maple is used for exterior finish of merry-go-rounds. Much of playground equipment calls for high grade, clear dimension stock and lumber free from defects, and the cost is above the average for all industries, yellow poplar, maple, oak and Douglas fir costing more than $50 per thousand feet f. o. b. factory. Black cherry is the only low-priced wood and it was purchased at home in log form. Over 75 per cent of the raw material consumed by this industry was grown in New York, long-

leaf pine, red pine and Douglas fir being the only woods used that are not obtainable within the borders of the State. There is not a great deal of waste in the production of playground equipments because much of the raw material comes to the factory in the form required for final use and even the small ends clipped from the posts of lawn swings, settees and park stepladders are reported as having been turned into such articles as dowel rods.

TABLE 47.— PLAYGROUND EQUIPMENT.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Beech	76,000	30.40	$29 87	$2,270	76,000	.....
Longleaf pine	45,000	18.00	40 00	1,800	.....	45,000
Yellow poplar	35,000	14.00	51 71	1,810	15,000	20,000
Birch	30,000	12.00	30 00	900	30,000	.....
White pine	30,000	12.00	39 67	1,190	10,000	20,000
Cherry (black)	15,000	6.00	18 00	270	15,000	.....
Red pine	7,000	2.80	40 00	280	.....	7,000
Ash	5,000	2.00	28 00	140	5,000	.....
Sugar maple	4,000	1.60	55 00	220	4,000	.....
White oak	2,000	.80	60 00	120	2,000	.....
Douglas fir	1,000	.40	70 00	70	.....	1,000
Total	250,000	100.00	$36 28	$9,070	157,000	93,000

AEROPLANES.

A new use for wood is found in the production of aeroplanes. At present practically all of the frame work consists of wood. Substitution has already been tried but without satisfaction. Metal tubing for posts and beams was used temporarily but proved to be too easily twisted or broken.

The aeroplane constructor is extremely careful in the selection of his lumber, demanding the best air-dried material obtainable. The total cost of lumber in the average machine ranges between $100 and $150 while the labor costs between $800 and $1,000.

The essential qualities of aeroplane woods include straightness of grain, strength, and lightness, while the stock must be free of all defects. The prime essential is straightness of grain. Certain woods are almost universally used for certain parts. The "struts" or upright posts which hold the planes apart, sometimes called "spreaders," are generally made of spruce from West Virginia or Oregon. The planes are also made of spruce and are of laminated construction, i. e., each post, beam or rib is made up of several strips of wood glued together, generally six strips forming one piece. No nails are used excepting a few tacks for the cloth covering.

The laminated construction has several advantages. To begin with, the planes are curved and the laminated ribs can be bent to such curve without splitting and without weakening the ribs appreciably. Again this lamination divides the stress and prevents it from falling in full force upon the grain of one strip.

The beams, usually 16 feet in length and running lengthwise the machine, are generally made of spruce. The grain must be straight enough to extend the entire length of the beam without crossing the diameter, or "running out."

One manufacturer was asked why spruce was so generally used for certain parts. He replied that while a few other woods have the desired mechanical properties, spruce is the only one that is reliably uniform; it is the only wood that is always exactly what it appears to be on the surface. If one goes into a lumber yard and selects what looks like clear, straight-grained spruce timber, he is always sure of the stock, while other woods like basswood may look straight-grained but will occasionally deceive one. In other industries, the manufacturer explains, there can be a small percentage of defective timber but not so in aerial machines. Upon the wood's reliability depends the life of the aviator, and spruce above all is free from hidden defects.

Ash is preferred for propellers which are also of laminated construction. Neither vibrations nor shocks can hardly ever split such propellers. Hickory is used for axles and for the "spiders" or braces over the axle. These two hickory parts are made from ordinary bent buggy poles or shafts and purchased out of ordinary vehicle stock. The buggy pole is divided into two pieces, the straight part being used for the axle while the bent part forms the brace.

The wheels are made entirely of metal. The skids to which the landing wheels are affixed are generally made of specially selected oak, ash or hickory dimension stock.

From a wood-using standpoint, the percentage of waste is large owing to the shaping requirements; but the total consumption is so small that waste is not a factor. The average cost of raw material in New York is high compared with other industries, but manufacturers elsewhere report as high as $100 or more per thousand feet.

The United States is reported to be rather behind foreign countries in the production of aerial machines, but the industry is now developing rapidly in this country. Establishments have orders far in excess of their capacity to fill readily. New York manufacturers are naturally the most active and several plants are in operation. The industry has already become highly specialized, no one firm manufacturing all parts — motors coming from one plant, wires from another, and wooden parts from still a third.

TABLE 48.— AEROPLANES.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
Spruce	15,200	48.41	$22 63	$344	10,200	5,000
Ash	6,500	20.70	35 08	228	4,500	2,000
Yellow poplar	4,200	13.38	40 00	168	1,000	3,200
White oak	3,500	11.14	42 29	148	1,500	2,000
Hickory	2,000	6.37	40 00	80	.....	2,000
Total	31,400	100.00	$30 83	$968	17,200	14,200

MISCELLANEOUS.

The miscellaneous table includes the reports from a number of minor industries in which the annual consumption of wood is too small for the publication of separate tables and it also includes larger industries, some of which are of much importance in the State, but the establishments are so few in number that the publication of their figures separately would reveal the identity of the firms making the report.. The data shows the consumption in the manufacture of bungs, butchers' blocks, butchers' skewers, dry kiln slats, matches, match cases, saddlery and hames, neck yokes, sewing machines, weighing apparatus, fiber boards, embalming boards, flower stems, tooth picks, explosives, fillers for rails, ties etc. White pine contributes over one-third of the wood consumed by these industries and is used in the form of sawdust for dynamite, in the form of deals and boards for the production of matches and match cases. Spruce is used in the manufacture of bungs and match cases; loblolly pine for scale boxes and fiber boards.

Sewing machines call for a large amount of red gum, yellow poplar, white and red oak. Butchers' blocks consume the major portion of hard maple; hames call for ash, white oak, hard maple and beech; hickory goes into neck yokes, while embalming boards and undertakers' supplies call for walnut and a small amount of the oaks. A large amount of longleaf pine is used as wood fillers for railroad rails. Paper birch goes largely into flower stems or florists' sticks, while dry kilns call for basswood and yellow poplar for use as drying slats.

Red gum is important in the manufacturing of sewing machines and is used in large amounts throughout the country. It is given preference over yellow poplar, but this latter wood is still used for drawer bottoms, sides and backs. Red gum forms the major portion of the outer woodwork and presents an attractive appearance, sometimes taking a finish in imitation of Circassian walnut. The white and red oaks are used in the form of veneer generally for machine covers and for facing for machine drawers.

White pine is used in great quantities by large match factories in

the northern portion of the State. This industry calls for 2-inch boards or deals of clear stock and free from all defects and it is largely shipped from the far West. The United States imports over 7,000,000 gross of boxes annually from Sweden and other foreign countries, where very many styles of matches and match box attachments are produced. New York, however, uses many millions of feet of lumber in her own factories for the production of matches and vies with Ohio and other States for first place in the industry. A match wood must be easily worked and capable of producing a moderate flame and also have the capacity of holding the dipping material well. Many types of machinery are used for match making. To produce the matches, the boxes into which they are packed and the labeling of boxes requires a very ingenious mechanism. There must be machines for cutting the lumber into strips and small blocks, for dipping the sticks, drying the matches and packing and labeling the boxes. Some inventors have devoted the whole of their lives toward the perfection of apparatus for the manufacture of matches. It is reported that the machine for filling the boxes with sticks alone took ten years' time of one skilled inventor.

Some New York manufacturers use hard maple in the manufacture of butchers' blocks, though other States generally prefer sycamore. This latter wood is especially preferred in Illinois where large quantities are used for this purpose. The two woods are not used in exactly the same way, however. The sycamore article is cut from large timbers and used in the solid form, while hard maple butcher blocks are built-up articles, consisting of 1-inch boards glued together into blocks of 24 inches diameter. Sugar maple is admirably suited to this purpose, having the appearance of extreme cleanliness with a beautiful, satin-like luster, while the wood is hard, fine-grained, compact and tough.

Hickory naturally is preferred for neck yokes. It has all the essential qualities of being very strong, very hard, very stiff, tough and capable of withstanding the severest twists or thrust. For heavy hauling and farm work no severer test is given a wood in the matter of strength, toughness and capacity to resist shock than is given in the use of neck yokes. Hickory combines all the essential qualities demanded for this article. Wood hames call for a large amount of white ash, white oak, sugar maple and beech. Metal has very generally superseded wood for hames used with light vehicles, but New York saddle and harness makers still utilize millions of feet annually in the production of wooden hames for heavy hauling and agricultural industries. White ash, white oak and hard maple are preferred. Strength, hardness and capacity to hold bolts are the principal requirements.

The manufacture of fiber boards from spruce and loblolly pine is a rather new industry and becoming important.

The miscellaneous industries of the State consume 30,790,300 feet of raw material at an average cost of $29.80 per M feet f. o. b. factory.

Many of these minor industries use home-grown woods only and are daily growing in importance in the manufacturing industries of the State of New York.

TABLE 49.— MISCELLANEOUS.

KIND OF WOOD	QUANTITY USED ANNUALLY		Average cost per 1,000 feet	Total cost f. o. b. factory	Grown in New York, feet b. m.	Grown out of New York, feet b. m.
	Feet b. m.	Per cent				
White pine	13,750,000	44.66	$32 80	$451,000	1,000,000	12,750,000
Spruce	5,754,000	18.69	24 35	140,100	2,504,000	3,250,000
Loblolly pine	3,850,000	12.51	20 45	78,750	.....	3,850,000
Red gum	1,500,000	4.87	35 00	52,500	.....	1,500,000
White oak	1,060,000	3.44	40 06	42,460	10,000	1,050,000
Beech	1,035,000	3.36	21 69	22,450	135,000	900,000
Longleaf pine	1,000,000	3.25	35 00	35,000	.....	1,000,000
Ash	800,000	2.60	40 00	32,000	.....	800,000
Yellow poplar	715,000	2.32	34 91	24,960	.....	715,000
Sugar maple	706,000	2.29	30 04	21,210	.....	706,000
Cottonwood	300,000	.98	16 33	4,900	250,000	50,000
Red oak	250,000	.81	40 00	10,000	.....	250,000
Basswood	35,000	.11	25 00	875	35,000	.....
Birch	25,000	.08	25 00	625	25,000	.....
Black walnut	10,000	.03	69 00	690	10,000	.....
Hickory	300	*	30 00	9	300	.....
Total	30,790,300	100.00	$29 80	$917,529	3,969,300	26,821,000

* Less than 1/100 of 1 per cent.

APPENDIX.

The foregoing data show what becomes of the wood after it leaves the sawmill, following the various steps in manufacture until the finished commodities are produced as furniture, vehicles, handles, etc. The study did not include a number of other industries because they had already been covered by the publications of the Bureau of the Census in the Department of Commerce. To make this report as comprehensible as possible a synopsis of the compilations of the Bureau of the Census is given in the following pages.

The New York State Conservation Commission collects data showing the production of forest products in this State and cooperates with the Census in the publication of the same. The figures in Table A have been copied from the Conservation Commission's report showing the number of active sawmills, the production of lumber, lath and shingles from the principal softwoods and hardwoods, and the average mill value of the output for the year 1911. Following Table A are statistics from the same source showing the consumption of wood in the production of pulp, slack staves, heading, hoops, veneer, hardwood distillation, tanbark, etc. In addition to such consumption, New York supplies a great amount of raw material for crossties and telephone and telegraph poles, but such data are not available by States because the Census Bureau obtains this information from railroads and other companies using these articles rather than from the producers.

Table A shows the output by species of 1,520 sawmills operating during 1911, together with the average value per M feet at the mill. Mills sawing less than 50,000 feet annually are omitted from the statistics. New York ranks twenty-third in the amount of lumber produced by the various States, her total production amounting to 526,283,000 feet as against 506,074,000 feet in 1910, an increase of four per cent over the latter year. Only two other States, Massachusetts and Wyoming, showed such a subtantial per cent of increase, while the great majority of lumber producing States showed a falling off, the average loss for the whole country being 7.5 per cent. In the number of active mills reporting in 1911, New York ranks fifth, being excelled only by North Carolina with 2,071 mills, Virginia with 2,005 mills, Pennsylvania with 1,636 mills and Tennessee with 1,536 mills. New York produced 1.4 per cent of the 37,003,207,000 feet of lumber cut in the United States in 1911, while Washington, the leading State, produced 6.1 per cent. As pointed out elsewhere, New York does not lead in the production of any one species, but occupies

fourth place in the production of beech and basswood; fifth in hemlock, spruce, maple and birch; sixth in elm; eighth in ash; and tenth in the production of chestnut lumber. There were 41,685,000 laths and 30,301,000 shingles produced in New York in 1911.

TABLE A.— NEW YORK LUMBER PRODUCTION, 1911.

Species.	Lumber sawed (M feet b. m.)	Average mill value per M feet
White pine	77,170	$19 87
Hemlock	129,001	15 50
Spruce	81,537	17 80
Cedar	379	....
Larch	65	....
Oak	27,446	21 45
Maple	65,313	16 52
Chestnut	16,571	17 44
Birch	28,465	17 46
Beech	41,026	14 43
Basswood	29,638	20 81
Hickory	1,175	18 60
Elm	12,462	18 76
Ash	10,727	21 46
Cottonwood	1,626	16 66
Sycamore	16	....
Walnut	3	....
All others	3,663	....
All lumber	526,283	$17 54
Active mills reporting (number)		1,520
Lath produced — number (thousands)		41,685
Shingles produced — number (thousands)		30,301

PULPWOOD CONSUMPTION.

New York leads all States in the consumption of wood for the manufacture of pulp. Although the report for 1911 shows a slight falling off from 1910 in the number of mills operating, such reduction of active plants did not affect the State's position among the pulp-producing States with respect to either the number of mills operating or the quantity of wood consumed. Indeed, New York made a substantial gain in the number of cords consumed in 1911, the total amounting to 1,049,110 cords as against 956,916 cords reported in 1910. Other leading States in the order of amounts consumed are as follows: Maine 955,768 cords, Wisconsin 591,918 cords, New Hampshire 403,013 cords, Pennsylvania 315,682 cords, North Carolina 159,624 cords, Michigan 144,446 cords, Oregon 119,890 cords,

West Virginia 114,907 cords and Virginia 98,618 cords. These ten States, including New York, consume 3,950,974 cords, while the grand total for the United States in 1911 amounted to 4,328,052 cords. The consumption of any other State is comparatively unimportant. The use of wood in New York amounts to nearly 25 per cent of the total consumption for all States and exceeds the combined amounts shown by Pennsylvania, North Carolina, Michigan, Oregon, West Virginia and Virginia.

The following table shows the species contributing to the production of pulpwood in New York:

	Cords.
Spruce	825,351
Hemlock	63,594
Poplar	70,811
Balsam fir	77,931
Pine	7,030
Cottonwood	305
All other species	2,400
Slab wood and other waste	1,688
Total	1,049,110

Spruce, therefore, contributes approximately 80 per cent of the material going into pulpwood in New York. Just why this species contributes so great a proportion is difficult to state in a few words. Its cheapness, abundance in compact stands around mill sites, and the ease with which it can be reduced to pulp by both the mechanical and sulphite processes are the primary causes for placing spruce in a leading position rather than the fiber qualities of the wood. Indeed, if basswood or tulip poplar were as plentiful and available in compact stands it is probable that their superior qualities would displace spruce almost entirely. Local accessibility in compact stands is the all-important consideration, and spruce will doubtless occupy first place for many years to come. Canadian spruce and poplar are imported into New York in large quantities, the amount of spruce imported in 1911 being 429,017 cords, or slightly over 50 per cent of the total spruce consumed. Spruce is reduced very largely by the mechanical process, hemlock principally by the sulphite process and poplar and pine very generally by the soda process.

TABLE B.— PULPWOOD CONSUMPTION IN NEW YORK.

Year.	Mills.	Wood consumed. (Cords)	Pulp produced. (Tons)
1911	94	1,049,110	773,607
1910	98	956,916	709,860
1909	90	921,882	686,323
1908	90	792,921	566,658

Slack Cooperage.

Table C shows the production of 53,169,000 slack staves in New York, or approximately four per cent of the 1,328,968,000 slack staves produced in the United States in 1911. Only seven States produce more slack staves than New York. These are Arkansas, Main, Michigan, Missouri, Pennsylvania, Tennessee and Virginia. In New York birch contributed 52.9 per cent of the production, with beech, maple and elm ranking next in importance. Red gum is used more extensively than any other species in the country at large, but its contribution in New York is small and is included under miscellaneous. In Arkansas red gum contributed over 128,000,000 of the 228,000,000 slack staves, over 133,000,000 of the 188,000,000 produced in Missouri, while for all States its contribution amounted to approximately 25 per cent of all slack staves produced in 1911. In Maine spruce contributed over 72.7 per cent. In Pennsylvania beech led all species in 1911, furnishing 46.6 per cent; while in Virginia, yellow pine ranked first with a contribution of 68.5 per cent of the State's total production. In the total production for all States in 1911 the principal contributing species, in the order of their importance, were as follows: red gum, pine, beech, elm, chestnut, spruce, ash, maple, birch, oak, tupelo and cottonwood. The major portion of slack barrels go for marketing agricultural products. Substitution of cotton, jute and paper sacks has limited the demand for slack staves, especially in the flour industry, the cost of substitutes being much less than staves. Other commodities now sold in sacks include sugar, cement, plaster, and salt; while the carton package is used for crackers, starch, sugar, salt and cranberries. However, the increased demand for slack barrels in other lines has probably offset the effect of competitive packages. The growth of the Portland cement industry and the development of apple orchards greatly increased the consumption of staves. Woods which dry quickly, steam well, retain their form when bent and which are comparatively free from resin and odor make the best stave material. Tight cooperage is unimportant in New York, the principal centers of such production being in Arkansas, Kentucky, Louisiana, Mississippi, New Hampshire, Tennessee and West Virginia.

New York produced 6,000,000 of the 106,407,000 sets of heading reported for the United States in 1911.

Elm is the principal hoop stock, its superior tensile strength recommending it above all others. Coiled elm hoops are made by slicing or sawing, the former methods being less wasteful because there is not even the loss of saw kerf. Most barrel hoops, however, are sawed and are generally between 1 and 2 inches wide, 3/16 inch thick on the thick edge, 1/16 inch thick on the thin edge, and ranging from 4 to 7 feet in length.

TABLE C.— SLACK COOPERAGE — QUANTITY OF STAVES PRODUCED IN NEW YORK, 1911.

Kinds of wood.	Slack staves produced (number).
Birch	28,116,000
Beech	10,173,000
Maple	9,224,000
Elm	3,834,000
Spruce	460,000
Ash	325,000
Oak	297,000
Cottonwood	228,000
Chestnut	127,000
Pine	75,000
All other	310,000
Total	53,169,000
Quantity of heading produced (number of sets)	6,000,000
Quantity of hoops produced (number)	351,000

VENEER.

The raw material going into the veneer plant is in the form of logs. There are three processes of manufacturing. In one process the logs are cut into square blocks called "flitches" and then passed through the usual process of sawed lumber, excepting that a special equipment is required for producing very thin lumber, whereby guide ways are used to hold the very thin boards upright and in proper position while the saw passes very slowly along the side of the log. Another process is that of "slicing" wherein the log is thoroughly steamed, squared and then dropped against a sharp knife extending the full length of the log. The third process is called "rotary cut" which is similar to the slicing method except that the log is prepared in round form, and after being steamed is revolved rapidly against a fixed knife. This latter process is the most economical, requires less skill and is in more general use.

Veneers are cut into many thicknesses, the domestic wood in rotary cut ranging generally from 1/50 inch to 5/16 inch in thickness while the imported woods are generally produced from 3/16 inch to 1/34 inch in thickness. The 3/16 inch thickness in the domestic woods is perhaps the most popular product, the next popular thicknesses being ⅛, ¼, 5/16, 1/16 and 1/20, in the order named. The standard mahogany veneer ranges from 1/24 to 1/28 inch in thickness.

The growing tendency to market many commodities such as fruits and vegetables in light weight packages has opened a wide field for thin lumber and the future promises extensive growth. Built up lumber consisting of several layers is becoming more important every year in many industries. Furniture tops, panels and backs, drawer fronts and bottoms, chair seats, trunks, store and office fixtures, packing boxes,

vehicle bodies and finish of passenger cars are examples of the product of veneer and built up lumber. The built up product has the advantage of being stronger than solid lumber for a given weight and is less liable to warp or check. In the shipment of fruit and vegetables where strength is unimportant and lightness is essential the rotary cut veneer lumber has opened up a wide field of utilization of many inferior species while more of such material is used as cores along with the high-grade sliced and sawed veneer in the manufacture of furniture and fixtures.

Species such as cottonwood were considered of little value, owing to its tendency to warp, until called for as a veneer wood. In built up lumber it serves with other woods for the middle layer. In the United States red gum is the principal veneer wood, but very many species are used. For outside finish, mahogany, Circassian walnut and English oak are the most popular imported woods; while hard maple, especially the rich figured wood, white oak and red gum are among the most popular domestic finishing woods.

With the exception of Spanish cedar, which generally goes into cigar boxes, the foreign woods are mostly used for the best grade of cabinet work, furniture and fixtures.

New York maintained its lead in the eastern States in the production of veneer in 1911 though there was a loss of nearly 6,500,000 feet. The following table D shows the quantity of wood consumed in New York for the years 1907 to 1911, inclusive:

TABLE D.— VENEER, 1907–1911.

	Feet, log scale.
1907	18,032,000
1908	15,693,000
1909	24,218,000
1910	29,999,000
1911	23,578,000

The wide range of thicknesses makes it impracticable to give the production of veneer in superficial measurements. It would also be out of harmony with the balance of the report to express the quantity of wood consumed in the form of linear feet. The consumption in 1911 amounted to 23,578,000 feet log scale.

WOOD DISTILLATION.

Valuable commercial products are obtained through wood distillation by two distinct processes — destructive distillation and steam distillation. In the former process the wood fiber is broken down and new compounds are formed, while in the steam process the wood retains its original form. In destructive distillation heat is applied below the vessel containing the wood and the heat vaporizes the vola-

tile compounds, such as turpentine, and breaks down the non-volatile compounds, such as wood gums, and forms a number of new compounds, leaving a residue of charcoal. The decomposition of wood in this process is complicated and not yet fully understood.

In obtaining the products from steam distillation the process is simpler, the wood being chipped, placed in a close receptacle into which the steam is blown from the boiler and the volatile compounds are vaporized and carried out of the retort with the steam. Although the wood is at times so much overheated that the wood fiber is slightly decomposed it is substantially correct to say that through steam distillation there is no decomposition of the wood fiber, while in the destructive distillation the fiber is destroyed. To be very simple, in one process the wood is only steamed, while in the other process the wood is charred or burned.

As there are two different processes of obtaining distillates, so there are two different classes of products obtainable from the various woods. The hardwoods, for example, such as beech, birch and maple, yield acetate of lime, wood alcohol and charcoal, while the softwoods, such as longleaf pine, yield turpentine, tar, oils and charcoal. This difference in the products is due to the fact that pine woods are resinous, while hardwoods are non-resinous. New York is not within the softwood distillation area, but the hardwood distillation plants are found principally in New York, Pennsylvania and Michigan, where an adequate supply of beech, birch and maple is available. These three woods produce nearly all of the commercial products, maple being preferred above all. The Forest Service has recently conducted the experiments to determine the comparative value of red gum, oak, hickory, chestnut and tupelo gum. In New York the oak and hickory may ultimately be utilized profitably, but the distillation of chestnut is not at present a success on account of its low yields of various products.

The distillation plants demand wood in cordwood lengths and it is allowed to season for a year. The products obtained have a variety of uses; charcoal is used in blast furnaces for the production of pig iron, in copper and sugar refiners, in the production of gunpowder or as fuel. Wood alcohol is sold under a variety of trade names, and is most widely used as a solvent in the production of shellacs and varnishes. The acetate of lime is used in the manufacture of wood vinegar and many commercial acetates. Denatured alcohol with its admixture of wood alcohol is now a market article.

The following Table E shows the amount of wood consumed in hardwood distillation in the United States. As will be noted, New York is one of the three important States in the consumption of wood for distillation products, Michigan, Pennsylvania and New York having 88 of the total of 105 establishments reporting during the year 1911. New York consumes 132,400 cords of wood or ⅛ of the total consumption of wood in the United States for such purposes. While the

industry is not so important in the consumption of mill waste in the North, it is considered to be a very economical line of utilization because of the consumption of a great deal of raw material in the form of cordwood and small bolts that cannot be utilized for the production of clear lumber. Distillation is rather a new utilization of forest products and the business is growing rapidly. New York woodlot owners having an abundance of the principal species needed for hardwood distillation, including beech, birch and maple, should obtain substantial benefit by the further growth of this industry.

TABLE E.—WOOD CONSUMED IN HARDWOOD DISTILLATION, 1911.

State.	Establishments reporting.	Cords.	Per cent. distribution.
Michigan	13	396,916	37.5
Pennsylvania	50	264,539	34.4
New York	25	132,400	12.5
All other States	17	165,100	15.6
Total	105	1,058,955	100.0

TANBARK.

The following Table F shows the quantity and cost of tanbark, wood, nuts, etc., used in New York, the figures (the latest available) being for the year 1909. Hemlock bark had the lowest average cost of any barks used for tanning. It is used principally in Pennsylvania, Wisconsin, Michigan, West Virginia and New York. These five States ranking in the order named, consumed 88.9 per cent. of the total hemlock used in the United States. The oak bark consumed in the eastern United States is generally chestnut oak (*Quercus prinus*). The consumption of mangrove bark was reported in 8 States, with Michigan, Pennsylvania and New York in the order named, together using 94.1 per cent of all the mangrove bark reported. Mangrove is native to the tropical marshes of both hemispheres and is imported largely from the West Indies and Portuguese Africa. Myrobalan nuts are entirely an imported product and New York ranks fifth in their consumption in the United States, the other leading States being Michigan, Pennsylvania, West Virginia and Wisconsin. The total consumption of bark, wood and nuts in New York amounts to 81,711 tons annually, for which the manufacturers pay an average of $10 per ton.

TABLE F.—QUANTITY AND COST OF TANBARK, WOOD, NUTS, ETC., USED IN NEW YORK.

Article.	Quantity (tons)	Average cost per ton.
Hemlock bark	76,774	$9 18
Oak bark	867	11 21
Mangrove bark	2,737	22 81
Myrobalan nuts	1,293	29 17
All other	40	65 00
Total	81,711	$10 00

WOOD USES BY SPECIES.

Applewood.

Canes.
Handles.
Planes.
Rules.
Saw handles.
Umbrella handles.
Vehicles.
Whips.

Arborvitae (Northern White Cedar).

Boat bottoms.
Boat decking.
Dairymen's supplies.
General millwork.
Ice cream freezers.
Interior finish.
Planing mill products.
Roof tanks.
Rowboats.
Shiplap.
Siding.
Signal devices.
Silos.
Tanks.
Yachts.

Ash.

Aeroplanes.
Axles.
Baseball bats.
Baskets.
Billiard rails.
Boats.
Bolsters.
Boxes.
Bread slicing machines.
Brick moulds.
Broom handles.
Butter packages.
Butter tubs.
Cabinets.
Car construction.
Casing.
Chairs.
Cheese boxes.
Costumers' doors.
Crates.
Cultivators.
Cushion rails.
Desks.
Drafting tables.
Fence.
Finish.
Fixtures (store, office).
Flooring.
Fork handles.
Furniture.

Ash — Continued.

Hames.
Handles (toy shovel).
Hayracks.
Hoe handles.
Hoops.
Ice boxes.
Interior trim.
Keyboards.
Ladders (rounds).
Machinery (frames).
Machinery (rods).
Mouldings.
Neck yokes.
Novelties.
Organs (frames).
Panels.
Piano tops.
Pickets.
Pick handles.
Plow beams.
Plow handles.
Plugs (for paper).
Poles (vehicles).
Porch swings.
Pump rods.
Refrigerators.
Rings.
Rollers (farm machinery).
Sash.
Seeder thills.
Ships.
Siding.
Signaling devices.
Single trees.
Sleds (hand).
Snow shovel handles.
Sofas.
Souvenirs.
Tables.
Tackleblock shells.
Threshers.
Toilet tanks.
Toilet seats.
Tongues.
Trunk slats.
Trunk strips.
Turnery.
Vestibules (cars).
Wagon poles.
Wagon (coasters).
Wash trays (frames).
Wash tubs (frames).
Whiffletrees.
Window frames.

Aspen.

Boxes.
Cheese boxes (heading).
Crates.
Packing cases.
Sheathing.

Balm of Gilead.

Boxes.
Frames (paper boxes).
Crates.
Packing.

Balsawood (Corkwood).

Life preservers.
Boat equipments.

Balsam Fir.

Boxes.
Cheese boxes (heads).
Crates.
Dairy supplies.
Doors.
Millwork.
Sash.
Trim.

Bamboo.

Canes.
Furniture.
Handles (umbrella, etc).
Racks.
Stands.
Tables.

Basswood.

Agricultural implements.
Automobiles.
Automobile panels.
Bank fixtures.
Basket covers.
Basket splints.
Beehives.
Berry baskets.
Billiard-table beds
Boats.
Boxes.
Bread boards.
Brooms.
Brushes.
Business-wagon bodies.
Butter ladles.
Cameras.
Candy buckets.
Cars.
Casing.
Caskets.
Ceiling.
Chairs.
Checkers.
Cheese box heading.
Children's blackboards.
Children's sled tops.
Cigar boxes.
Clocks.
Clothes baskets.
Clothes pins.
Corn planters.
Crates.
Curtain stretchers.
Doubletrees.
Dowels.
Drawer bottoms.
Drills.
Dumbwaiters.
Elevators.
Engraving boards.
Excelsior.
Feeders.
Filing cabinets.
Flooring.
Furniture.
Games.
Go-carts.
Graders (peach).
Grain hoppers.
Grass seeders.
Guitars.
Hand sled tops.
Hayracks.
Hobby horses.
Incubators.
Indian clubs.
Ironing boards.
Kitchen cabinets.
Kitchen tables.
Lard tubs.
Lasts.
Lawn furniture.
Mandolins.
Medicine cases.
Moulding.
Music cabinets.
Novelties.
Packing boxes.
Pails.
Panels.
Pastry boards.
Patterns.
Pencils.
Pianos.
Piano players.
Picture frames.
Printers' cabinets.
Refrigerators.
Rulers.

Basswood — Continued.

Scientific instruments.
Seed cabinets.
Shoe trees.
Shoe forms.
Shop patterns.
Show cases.
Shredders.
Siding.
Silos.
Singletrees.
Skids.
Sleeve boards.
Sleigh bodies.
Spools.
Stackers.
Stanchions.
Store fixtures.
Threshing machines.
Tool boxes.
Toys.
Trays (egg).
Trunks.
Tubs.
Turnery.
Velocipede seats.
Wagons.
Wagon boxes.
Wardrobes.
Washboards.
Washing machines.
Well buckets
Wheelbarrows.
Window frames.
Woodenware.
Yardsticks.

Beech.

Agricultural implements.
Auto-seat frames.
Bobbins.
Boxes.
Brick molds.
Broom handles.
Brushes.
Built-up panels.
Butcher blocks.
Butter dishes.
Butter tubs.
Cable reels.
Cars.
Chairs.
Chair bottoms.
Chair rods.
Cheese boxes.
Clocks.
Clothes pins.
Coat hangers
Coops.
Crating.
Dowels.
Drafting tables.
Electrotype plates.
Farm machinery.
Filing cabinets.
Fixtures.
Furniture.
Grain doors.
Hames.
Handles.
Hand sleds.
Ironing boards.
Ladders.
Lawn swings.
Musical instruments.
Novelties.
Pails.
Panels.
Pianos.
Pipe organs.
Printers' cabinets.
Pulleys.
Pumphandles.
Pump buckets.
Refrigerators.
Rope reels.
Sash.
Sectional bookcases.
Show cases.
Skates.

Beech — Continued.

Sounding boards.
Stanchions.
Stepladders.
Tables.
Tie plugs.
Trunks.
Tubs.
Wardrobes.
Washing machines.
Washboards.
Weighing machines.
Wheelbarrows.
Window screens.
Woodenware.

Birch.

Agricultural implements.
Baskets.
Boat finish.
Bobbins.
Bookcases.
Boxes.
Broom handles.
Broom heads.
Brush backs.
Built-up panels.
Buffets.
Butter boxes.
Butter molds.
Cabinets.
Cameras.
Canes.
Car finish (vestibules).
Carvings.
Casing.
Ceiling.
Chair rods.
Cheese boxes (hoops).
Clocks (turnery parts).
Couch frames.
Crating.
Desks.
Dowels.
Dumbwaiter cars.
Electrotype bases.
Fixtures (exterior parts).
Flooring.
Furniture.
Games.
Harvesters.
House trim (general).
Interior finish.
Kodaks.
Lawn mowers.
Mantels.
Mirror backs.
Moulding.
Office fixtures.
Panels.
Paper plugs.
Parlor furniture.
Partitions.
Peavey handles.
Picture frames.
Plumbers' woodwork.
Pulleys.
Refrigerators.
Sash pins.
Screen frames.
Settees.
Shoe pegs.
Shoe trees.
Show cases.
Sofas.
Spool heads.
Swings.
Store fixtures.
Umbrella handles.
Tables.
Tackleblock shells.
Thresher parts.
Toys.
Tubs.
Wall fixtures.
Woodenware.

Black Cherry.

Baskets.
Beds.
Boat finish.
Bookcases.
Brushes.
Bushel crates.
Butter dishes.
Cabinets.
Camera boxes.
Card trays.
Cars (finish).
Casing.
Caskets.
Chairs (posts, rounds).
Clock cases.
Coffins.
Collar trays.
Counters.
Desks.
Doors.
Dowels.
Dressers.
Flasks.
Flooring.
Electrotype blocks.
Engraving blocks.
Glove stretchers.
Handles (duster brush).
Interior finish.
Kodaks.
Last blocks.
Level blocks.
Level sticks.
Library furniture.
Machine boxes.
Moulding.
Musical instruments.
Office fixtures.
Panels.
Partitions.
Passenger cars.
Patterns.
Piano actions.
Piano cases.
Piano players.
Piano rails.
Pipe organ (cases, actions).
Road machines (cabs, boxes).
Sash.
School furniture.
Settees.
Shoe lasts.
Siding.
Spindle stock.
Spoons.
Store fixtures.
Swings.
Switchboards.
Tables.
Table drawers.
Table legs.
Trim.
Woodenware.

Black Walnut.

Air-gun stock.
Benches.
Billiard cues.
Bookcases.
Brush backs.
Bureaus.
Cabinet work.
Canes.
Card tables.
Carpet sweepers.
Case work.
Caskets.
Chairs.
Chair legs.
China closets.
Chiffoniers.
Clock cases.
Coffins.
Couches (legs).
Desks.
Doors.
Electrical appliances (bases).
Embalming boards.
Fixtures (exterior parts).

Black Walnut — Continued.

Fixtures, office.
Fixtures, store.
Furniture.
Gunstocks.
Inlaid work.
Interior finish.
Machine boxes.
Moulding.
Novelties.
Organ cases.
Parquetry flooring.
Pianos.
Piano actions.
Piano benches.
Piano cases.
Piano players.
Picture frames.
Pipe organs.
Sideboards.
Side tables.
Stools.
Tool boxes.
Umbrella handles.
Vehicles.
Woodenware.

Black Gum.

Boxes.
Crates.
Packing cases.
Shipping cases.

Boxwood.

Canes.
Rulers.
Scientific instruments.
Umbrella handles.
Umbrella sticks.
Yard sticks.

Buckeye.

Doors.
Interor finish.
Piano panels.
Trim.

Butternut.

Boat decks.
Boat finish.
Boat seats.
Cabinets.
Cameras.
Cheese box heading.
Doll carriages.
Excelsior.
Interior finish.
Kodaks.
Moulding.
Piano cases.
Piano moulding.
Screen frames.
Show cases.
Store fixtures.
Tables.
Threshing machines.
Toys.
Vehicles.

Circassian Walnut.

Boat finish.
Billiard cues.
Billiard tables.
Casing.
Chairs.
Cigar chests.
Coffins.
Desks.
Doors.
Drawer fronts.
Electrical apparatus (woodwork).
Fixtures.
Frames.
Furniture.

Circassian Walnut — Continued.

Furniture (office).
Interior finish.
Mouldings.
Musical instruments.
Office fixtures.
Partitions.
Piano cases.
Piano legs.
Piano mouldings.
Piano pilasters.
Pipe organs (finish).
Refrigerators.
Sash.
Store fixtures.
Tables.

Cocobola.

Cutlery handles (general).
Knife handles.

Congo.

Canes.
Umbrella sticks.
Whipstocks.

Corra.

Canes.
Umbrella handles.

Cypress (*Bald*).

Agricultural implements.
Baseboards.
Blinds.
Boat doors.
Boat frames.
Boat lockers.
Boat panels.
Burial caskets (outer boxes).
Cabinets.
Cab tops.
Car roofing.
Cars.
Car siding.
Ceiling.
Closets.
Coffins.
Conveyors.
Cornice.
Counter tops.
Dairymen's supplies.
Doors.
Dressers.
Exterior finish.
Fence pickets.
Finish.
Fixtures.
Flasks.
Interior trim.
Launches (sides).
Laundry tubs.
Mouldings.
Musical instruments.
Office fixtures.
Organs (frames).
Panels.
Patterns.
Pulleys (boxing).
Pump covers.
Refrigerators.
Road rollers.
Sash.
Screen frames.
Shelving.
Ships (sash, panels).
Siding.
Signaling devices.
Silos.
Spraying apparatus.
Store fixtures.
Store fronts.
Tanks.
Trim (boat).
Vehicles.
Washing machines.
Window frames.

Cotton Gum.

Boxes.
Cigar boxes.
Clock cases.
Crates.
Doors.
General millwork.
Sash.

Cottonwood.

Agricultural implements.
Berry boxes.
Boxes.
Buckets.
Built-up panels.
Cheese boxes (heads).
Corn huskers.
Crates.
Cutter bodies.
Excelsior.
Explosives (dynamite sawdust).
Fanning-mill drums.
Feeders.
Fixtures.
General millwork.
Grape trays.
Interior finish.
Lawn swings.
Machines (rolls for paper).
Matches.
Office fixtures (backs).
Pails.
Paper pulp.
Pianos (cut-offs).
Pianos (pillars).
Picture frames.
Planing mill products.
Show cases (backs).
Spindle stock.
Store fixtures (boxes).
Tanks.
Threshing machines.
Tubs.
Vehicle panels.
Wagon bodies.
Wagon seats.
Washboards.
Woodenware.

Cucumber.

Cabinets.
Casing.
Casket trim.
Cheese boxes (heads).
Flooring.
Frames.
Furniture.
Moulding.
Pails.
Stairs.
Trim.
Tubs.

Douglas Fir.

Boat beams.
Boat decking.
Boat flooring.
Boat siding.
Ceiling.
Derrick poles.
Doors.
Engine cabs.
Exterior finish.
Flag poles.
Flooring.
Interior finish.
Ladders.
Sash.
Ship beams.
Ship siding.
Ship sills.
Spars (ship and boat).
Vehicles.

Ebony.

Billiard cues.
Bowling balls.
Brushes.
Canes.
Cutlery (handles).
Knife handles.
Parasol handles.
Parquetry flooring.
Sporting goods.
Umbrella handles.
Whipstock.

Elm.

Agricultural implements.
Banana baskets.
Baskets (bottoms, covers).
Boxes.
Bushel crates.
Chairs.
Cheese boxes (heads, hoops).
Cigar boxes.
Cradle bows.
Crating (posts, corners).
Couch frames.
Feed tables.
Fixtures.
Fruit cases (handles, hoops).
Furniture (frames, drawer bottoms, ends).
Grain drills.
Grape trays.
Handles.
Harvesters.
Hayracks.
Instruments, musical.
Laundry appliances.
Machine construction.
Mowers (poles).
Planing mill products.
Reapers (poles).
Refrigerators.
Rockers.
Sash.
Ships.
Sporting goods.
Toys.
Trunks (slats).
Tubs.
Vehicle poles.
Whiffletrees.
Woodenware.

English Oak.

Desks.
Flooring (parquetry).
Furniture.
Interior finish.
Interior trim.
Parquetry.

Furze.

Canes.
Handles.
Umbrella stock.

Granadillo (Cocowood).

Cutlery handles.
Knife handles.

Haw.

Canes.
Umbrella sticks.
Whipstocks.

Hemlock.

Agricultural implements.
Baskets.
Blinds.
Boxes.
Cars.
Crates.
Dairymen's supplies.
Doors.
Fencing (pickets).
Flasks.
Flooring.
Furniture.
Gates (picket).
Instruments, musical.
Machines.
Machinery and apparatus (electrical).
Patterns.
Sash.
Ships.
Sporting goods.
Vehicles.

Hickory.

Agricultural implements.
Automobile wheels.
Baskets.
Boats.
Buggy shafts.
Buggy spokes.
Canes.
Car construction (grab handles).
Chairs (rounds).
Doubletrees.
Eveners.
Gates (pickets).
Handles.
Instruments (tripods).
Ladders.
Mallets.
Machines.
Neckyokes.
Printing.
Refrigerators.
Rounds.
Shoe shanks.
Singletrees.
Spokes.
Sucker rods.
Trunks.
Vehicles.
Wagon tongues.
Woodenware.

Holly.

Musical instruments.
Piano actions.

Hornbeam.

Canes.
Umbrella sticks.
Whipstocks.

Lancewood.

Canes.
Umbrella sticks.
Whipstocks.

Lignum-Vitae.

Bowling balls.
Castor wheels.
Furniture.
Handles.
Mallets.
Pulleys.
Sporting goods.
Tackleblock shells.
Tackleblock wheels.
Steering wheels.

Locust.

Flasks.
Patterns.
Turnery.

Loblolly Pine.

Agricultural implements.
Cheese boxes (heads).
Clocks (packing cases).
Crates.
Doors.
Finish.
Fixtures.
Garden implements.
Grain bins.
Kitchen cabinets.
Ladders.
Novelties.
Packing boxes.
Refrigerators.
Sash.
Scale boxes.
Silos.
Tanks.
Trim.
Vehicles.
Woodenware.

Longleaf Pine.

Agricultural implements.
Boats.
Boxes.
Box cars.
Box car decking.
Box car framing.
Box car siding.
Cameras.
Car sills.
Cattle stanchions.
Crates.
Doors.
Elevators.
Ensilage cutters (poles).
Flooring.
Grain drills.
Harrows (poles).
Harvesting machines (poles).
Hay racks.
Interior finish.
Kitchen cabinets.
Ladders (sides).
Laundry appliances.
Office fixtures.
Platforms.
Refrigerators.
Sash.
Silos.
Spraying machines (poles).
Spraying machines (tanks).
Surveyors' stakes.
Tanks.
Threshing machines.
Trim.
Vehicles.
Woodenware.

Mahogany.

Billiard cues.
Boat finish.
Book cases.
Brushes.
Car finish.
Caskets.
Clock cases.
Engraving blocks.
Fixtures (exterior).
Furniture.
Instruments, musical.
Instruments, scientific.
Interior finish.
Machinery, electrical (bases).
Patterns.
Sporting goods.
Umbrella handles.
Vehicles.

Canes.

Canes.
Umbrella sticks.

Canes.
Umbrella sticks.

Canes.
Umbrella sticks.

Canes.
Umbrella sticks.

Shoe lasts.

Baskets.
Boxes.
Cheese boxes (heading).
Crates.

Canes.
Caskets (burial).
Chairs.
Chests.
Fixtures.
Furniture.
Instruments (musical).
Interior finish.
Furniture.

Boat finish.
Bookcases.
Boxes.
Cabinets.
Cars.
Desks.
Doors.
Drawers (panels).
Dressers.
Finish.

Malacca.

Umbrella handles.

Orange

Whipstocks.

Partridge.

Whipstocks.

Pea.

Whipstocks.

Peach.

Whipstocks.

Persimmon.

Shoe lasts (infants).

Pitch Pine.

Dairymen's supplies.
Finish.
Planing mill products.
Trim.

Red Cedar.

Instruments (musical).
Sash.
Siding.
Silos.
Tanks.
Umbrella handles.
Vehicles.
Woodenware.

Red Gum.

Fixtures.
Furniture.
Instruments, musical.
Instruments, professional.
Kitchen cabinets.
Machinery (frames).
Office fixtures.
Pianos (actions).
Piano benches.
Piano players.

Red Gum — Continued.

Refrigerators.
Tables.
Threshing machines.
Trunks (slats).
Vehicles.
Woodenware.

Red Oak.

Agricultural implements.
Boats.
Boxes.
Car construction.
Caskets.
Coffins.
Clocks (cases).
Crates.
Elevators.
Interior finish.
Fencing (pickets).
Fixtures.
Flasks.
Flooring.
Furniture.
Gates.
Molding.
Musical instruments.
Laundry appliances.
Machine construction.
Patterns.
Picture frames.
Plumbers' woodwork.
Pumps (platforms).
Refrigerators.
Sash.
Ships.
Signs.
Scientific instruments.
Vehicles.
Woodenware.

Rattan.

Canes.
Umbrella handles.
Whipstocks.

Redwood.

Caskets.
Coffins.
Dairymen's supplies.
Doors.
Flasks.
Interior finish.
Musical instruments.
Patterns.
Sash.
Signs.

Rosewood.

Billiard tables.
Brush backs.
Cabinets.
Cigar chests.
Electrical apparatus.
Fixtures.
Fixtures, store.
Flooring.
Furniture.
Knife handles.
Guitars.
Mandolins.
Musical instruments.
Parquetry.
Pianos (legs).
Piano pilasters.
Picture frames.
Show cases.
Sporting goods.

Sassafras.

Novelties.
Rustic mementos.
Souvenirs.
Woodenware.

Satinwood.

Coffins.
Flooring.
Inlaid work.
Musical instruments.
Pianos.
Parquetry.

Scotch Thistle.

Canes.
Parasol handles.
Umbrella handles.
Umbrella sticks.
Whip stocks.

Silver Maple.

Baskets.
Boats.
Boxes.
Chairs.
Cigar boxes.
Crates.
Dairymen's supplies.
Doors.
Elevators.
Furniture.
Instruments, musical.
Instruments, professional.
Machine construction.
Pumps.
Refrigerators.
Sash.
Shoe lasts.
Ships.
Vehicles.
Woodenware.

Sitka Spruce.

Musical instruments (backs).
Organs.
Pianos.
Sounding boards.

Spanish Cedar.

Cigar boxes.
Hammer shanks for pianos.

Spruce.

Agricultural implements.
Aeroplanes.
Ballup sleepers.
Boats.
Boat oars.
Bowling alleys.
Boxes.
Bungs.
Cable reels and spools.
Cameras.
Car sheathing.
Crates.
Doors.
Elevator platforms.
Farm machinery.
Fiber board.
Fixtures, backing.
Fixtures, linings.
Fixtures, office.
Fixtures, store.
Flag poles.
Flooring.
Furniture (hidden parts).
Guitars.
Hay presses.
Ice boxes.
Keyboards.
Kodaks.
Ladder sides.
Mandolins.
Match cases.
Mouldings.
Moulding flasks.
Musical instruments.

Spruce — Continued.

Novelties.
Organ pipes.
Patterns.
Piano backs.
Piano benches.
Piano cases.
Piano ribs.
Piano sounding boards.
Pipe organs.
Player actions.
Refrigerators (inside partitions).
Scaffolding.
Ships.
Shiplap.
Silos.
Skids.
Spars.
Tanks.
Vehicles.
Woodenware.

Sugar (Hard) Maple.

Agricultural implements.
Balls.
Baseball bats.
Baskets.
Bedroom furniture.
Billiard cues.
Billiard tables.
Blueprint frames.
Boat finish.
Bobbins.
Bobsleds.
Bowling alleys.
Boxes.
Brewers' chips.
Broom handles.
Brush backs.
Brush handles.
Butcher blocks.
Butter ladles.
Butter moulds.
Cameras.
Canes.
Car finish.
Car flooring.
Carpet sweepers.
Castor rollers.
Ceiling.
Chair bottoms.
Chair rods.
Checkers.
Children's wagons.
Clothespins.
Coat hangers.
Corn planters.
Corn shellers.
Cot frames.
Croquet balls.
Croquet mallets.
Cultivator handles.
Curtain poles.
Desks.
Dishes.
Doors.
Dowels.
Dominoes.
Drill frames.
Dumbwaiters.
Electrotype blocks.
Elevators.
Ensilage cutters.
Factory trucks.
Feeders.
Fixtures.
Flasks.
Folding camp chairs.
Flooring.
Furniture.
Games.
Go-carts.
Grain drills.
Grain separators.
Grass seeder frames.
Guitars.
Hames.
Handles.
Hay presses.

Sugar (Hard) Maple — Continued.

Indian clubs.
Interior finish.
Kitchen cabinets.
Kodaks.
Ladders.
Lasts.
Lawn mowers.
Mallets.
Mangle rollers.
Map rollers.
Medicine cabinets.
Merry-go-rounds.
Moulding.
Musical instruments.
Novelties.
Office fixtures.
Organs.
Paddles (boat).
Parasol handles.
Partitions.
Parquetry flooring.
Patterns.
Pianos.
Piano bridges.
Piano players.
Plow beams.
Plumbers' woodwork.
Porch swings.
Potato mashers.
Pulleys.
Pumps.
Pump buckets.
Racks.
Refrigerators.
Road rollers.
Rules.
Sash.
Separators.
Shade rollers.
Shoe forms.
Show cases.
Signs.
Skids.
Sleighs.
Spool barrels.
Spoons.
Steering wheels.
Tanks.
Tanning drums.
Talking machines.
Tenpins.
Threshers.
Toys.
Towel racks.
Type cabinets.
Umbrella handles.
Vehicles.
Wagons.
Washboards.
Washing machines.
Wash tray covers.
Wheelbarrows.
Woodenware.
Wood type.
Yardsticks.

Sugar Pine.

Blinds.
Doors.
Flooring.
Interior finish.
Millwork (general).
Mouldings.
Musical instruments.
Organs (wind chests).
Panels.
Partition.
Sash.
Trim.
Window frames.

Sycamore.

Boxes.
Crates.
Desks (backs).
Drawers (backs, sides).
Flooring.
Furniture.
Planing mill products.
Siding.
Trim.

Boat floors.
Boat stringers.
Boxes.
Ceiling.
Crates.
Finish.
Flooring.

Athletic goods.
Flooring.

Fixtures.
Office fixtures.

Canes.
Umbrella handles.

Canes.
Parasol sticks.

Baskets.
Berry boxes.
Boat scoops.

Barges.
Boat planks.
Boat repairs.
General boat repairs.
Ships, framing.

Blinds.
Boats.
Doors.
Interior finish.
Launches.

Blinds.
Boats.
Boat ceiling.
Boat decking.
Ceiling.
Cheese boxes.
Dairy supplies.

Tamarack.
Millwork.
Moulding.
Planing mill products.
Ships.
Siding.
Trim.

Teak.
Parquetry.
Sporting goods.

Vermillion.
Show cases.
Store fixtures.

Weitzel.
Whipstocks.

Whangee.
Umbrella handles.
Whipstocks.

Willow.
Fruit crates.
Packing cases.
Vegetable crates.

Western Larch.
Silos, framing.
Tank covers.
Tank frames.
Windmills.

Western Red Cedar.
Rowboats.
Sash.
Ship hulls.
Siding.

Western White Pine.
Doors.
General millwork.
Incubators.
Interior finish.
Sash.
Siding.
Vehicles.

Western Yellow Pine.

Barges.
Blinds.
Boats.
Boat planking.
Boat siding.
Doors.
Interior finish.
Sash.
Ship planking.
Window frames.

White Oak.

Aeroplanes.
Agricultural implements.
Athletic goods.
Boxes.
Car construction.
Caskets.
Coffins.
Clocks.
Crates.
Elevators.
Interior finish.
Fencing (pickets).
Fixtures.
Flasks.
Flooring.
Furniture.
Gates.
Handles.
Harvesters.
Moulding.
Musical instruments.
Laundry appliances.
Machine construction.
Patterns.
Picture frames.
Plow beams.
Plow handles.
Plumbers' woodwork.
Pumps (platforms).
Refrigerators.
Rollers (land).
Sash.
Ships.
Signs.
Spokes.
Scientific instruments.
Threshing machines.
Vehicles.
Woodenware.

White Pine.

Agricultural implements.
Automobile bodies.
Backing (pictures).
Blinds.
Boat flooring.
Boxes.
Buckets.
Burial boxes.
Ceiling.
Clocks.
Doors.
Elevators.
Feeders.
Flooring.
Foundry flasks.
Frames.
Furniture.
Interior finish.
Kitchen cabinets.
Matches.
Moulding.
Office fixtures.
Passenger cars.
Patterns.
Porch columns.
Pumps.
Refrigerators.
Sash.
Ships.
Siding.
Silos.
Store fixtures.
Tanks.
Threshers.
Trunks (boxes).
Tubs.
Vehicles.
Woodenware.

Witch Hazel

Canes.
Doors.
Lattice work.
Trim.
Umbrella sticks.
Whipstocks.

Yellow Poplar.

Aeroplanes.
Automobile bodies.
Billiard tables.
Boxes.
Buggy bodies.
Brushes.
Cabinets.
Cars (finish).
Ceiling.
Chairs.
Cigar boxes.
Drills.
Elevators.
Excelsior.
Furniture.
Instruments, musical.
Instruments, professional.
Interior finish.
Merry-go-rounds (horses).
Packages.
Patterns.
Plumbers' woodwork.
Pool tables.
Pumps.
Refrigerators.
Sash.
Ships.
Vehicles.
Woodenware.

DIRECTORY.

The following is a list of the manufacturers who co-operated in the collection of the data contained in this report. Occasionally a firm failed to give the desired data and estimates from the next best available source were taken. A great many wood-using establishments including cooperage, poles, ties, veneer, and assembling establishments, are not covered by this investigation, but reported by the United States Census and summarized in this report. Manufacturers who produce several products will appear in this list under more than one industry. Many manufacturers make boxes and crates for their own use only.

AEROPLANES.

American Aeroplane Supply House..... Hempstead.
International Aeronautic Construction Co..... Jamaica.
Beekman Sash, Door and Wood-working Co.... New York.

AGRICULTURAL IMPLEMENTS.

J. S. Harrison & Co..... Addison.
P. K. Dederick's Sons..... Albany.
International Harvester Co..... Auburn.
Quick & Thomas Co..... Auburn.
Champion Drill Co..... Avon.
Batavia Machine Co..... Batavia.
The Johnson Harvester Co..... Batavia.
Wiard Plow Co..... Batavia.

P. E. Kinnehan	Brasher Falls.
Chas. Codman	Brownville.
Buffalo Pitts Co.	Buffalo.
Bean Harvester Co.	Caledonia.
Cambridge Steel Plow Co.	Cambridge.
Castile Chilled Plow Co.	Castile.
S. K. Campbell Co. Ltd.	Central Bridge.
Geo. Diefendorf.	Chaumont.
L. R. Loomis.	Claverack.
P. J. Burdett.	Clifton.
Harder Mfg. Co.	Cobleskill.
Columbia Plow Works.	Copake Falls.
S. H. Peck.	East Aurora.
Neenan Bros.	East Bloomfield.
Ontario Drill Co.	East Rochester.
Field Force Pump Co.	Elmira.
C. J. Peters.	Fabius.
Geo. J. Emery Co.	Fulton.
Friend Mfg. Co.	Gasport.
C. F. Bushnell.	Gilbertsville.
Gowanda Agri. Works.	Gowanda.
Lyon Iron Works.	Greene.
W. Eddy Plow Co.	Greenwich.
B. A. Evans.	Hammond.
Wells Purcell	Hemlock.
Hillsdale Plow Co.	Hillsdale.
Hendricks Hay Press Co.	Kingston.
W. A. Wood Mowing & Reaping Mach. Co.	Hoosick Falls.
Babcock Mfg. Co.	Leonardsville.
Leroy Plow Co.	Leroy.
A. A. Clark & Sons.	Marion.
C. A. Lind & Son.	Marion.
Everts Mfg. Co.	Meridian.
David R. Wagner.	Meridian.
Genesee Valley Mfg. Co.	Mt. Morris.
Munnsville Plow Co.	Munnsville.
International Harvester Co.	Newark Valley.
Coldwell Lawn Mower Co.	Newburgh.
T. C. Ginney.	Peterboro.
Crown Mfg. Co.	Phelps.
F. W. Anderson.	Portland.
Adriance Platt & Co.	Poughkeepsie.
Anchor Bolt & Nut Co.	Poughkeepsie.
C. C. Kirkland.	Pratts Hollow.
The Johnston Harvester Co.	Redfield.
Fred Greene	Richford.
Geo. P. Bortle Co.	Rochester.

Clark Machine Co.	St. Johnsville.
Westinghouse Co.	Schenectady.
Papec Machine Co.	Shortsville.
Star Seeder Co.	Shortsville.
Norman B. Sheppard.	Skaneateles.
J. I. Case Threshing Mach. Co.	Syracuse.
Engelberg, Huller Co.	Syracuse.
E. C. Stearns & Co.	Syracuse.
Syracuse Chilled Plow Co.	Syracuse.
Snyder Combined Thresher Co.	Troy.
William Hasard	Trumansburg.
Warsaw Wilkenson Co.	Warsaw.

Basket and Fruit Packages.

Spies Basket Co.	Adams.
Albany Basket Co.	Albany.
C. M. Mallory.	Albion.
Fred Washburg	Alpine.
B. F. Dailey & Sons.	Atlanta.
J. F. Harris.	Bellona.
Howland Bros.	Berkshire.
H. B. Harding.	Breesport.
Crandall Panel Co.	Brocton.
Geo. Fisher Planing Mill.	Burnhams.
E. H. Dudley & Co.	Cameron and Bath.
Hadley Bros.	Cameron.
Canisteo Woodenware Co.	Canisteo.
Superior Register Co.	Canisteo.
B. Landers & Son.	Cassadaga.
P. J. Burdett.	Clifton.
F. W. Barker.	Coopers Plains.
H. H. Littur.	Coopers Plains.
J. C. Fish.	Corbetsville.
G. H. Capels.	Dresden.
A. L. Harris.	East Nassau.
Eden Planing Mill Co.	Eden Center.
Geo. W. Dibble.	Elka Park.
Garnsey Wood	Elnora.
Florida Package Mfg. Co.	Florida.
Chas. R. Hayes.	Forestport.
Bacon & Co.	Gasport.
Hartfield Veneer Mill.	Hartfield.
G. H. Upton.	Hartfield.
M. A. Presler.	Highland.
J. E. Westcott.	Highland.
St. Regis Indian Trading Co.	Hogansburg.
John Horton	Horseheads.
Weager & Grove.	Interlaken.

George O. Bennett	Ira Station.
Irondequoit Coal & Supply Co	Irondequoit.
D. E. Drake	Jasper.
M. Tinklepaugh	Kinderhook.
John Rafferty	King Ferry.
Fred Wildey	Livingston.
Wm. Bailey	Lodi.
Seymour Terwilliger	Medina.
Geo. A. Courbat	Mallory.
E. E. Wyget	Marlboro.
Willis Halsted	Middleport.
Newfane Basket & Mfg. Co	Newfane.
A. D. Relyea	New Paltz.
W. N. Cardner	New Woodstock.
W. H. Bagley	Niobe.
Alfred Darling	North Clymer.
S. R. VerDow	Ontario.
Oxford Basket & Mfg. Co	Oxford.
Barden & Bobeson (Inc.)	Penn Yan.
Guile & Windnagle	Penn Yan.
Geo. A. Campbell	Portageville.
W. E. Dudley	Portland.
W. B. Pierce & Co	Pulteney.
A. K. Young	Pulteney.
Ransomville Basket Co	Ransomville.
Fred Swick	Reynoldville.
W. B. Rickenbrode	Ripley.
W. F. Royce	Ripley.
J. Leef	Rossie.
C. E. Cobb	Sherman.
Arthur C. Angrom	Silver Creek.
Harry Ehmke	Silver Creek.
H. S. Bradley & Co	Sodus.
Chester Conant	Sodus.
Lyons Mills	Solsville.
Frank S. Mead	Somerset.
The Hibbard Basket Works	South Butler.
D. R. Fuller	Springlake.
Frederickson & Bussing	Stockton.
B. O. Taylor	Stockton.
Geo. W. Burr	Valois.
W. H. Wardner	Valois.
W. L. Shink	Varysburg.
A. L. Smith Co. (Federal Crate & Basket Co.)	Watkins.
Wm. Brimmer	Wayne.
J. D. Nivison	Webster.
Webster Basket Co	Webster.

W. H. Rogers	Wells Bridge.
American Novelty Co.	Wellsville.
Falvay Bros. Basket Co.	Westfield.
George J. Druschel	West Walworth.

Ship and Boat Building.

R. W. Savage & Son	Akron.
Thomas Thurston	Alexandria Bay.
Rubin Miller	Amagansett.
Wood Lumber Co.	Amityville.
Patrick Ward & Co.	Astoria.
Frank S. Howland	Athens.
R. Lenahan	Athens.
Willard F. Downs	Bay Shore.
Albert V. Rogers	Bay Shore.
H. V. Watkins	Bellport.
Barber & Robinson	Bolton Landing.
Geo. Granger	Bolton Landing.
Fred R. Smith	Bolton Landing.
William J. Ridgely	Boonville.
Buffalo Dry Dock Co.	Buffalo.
Ira S. Bushy	Brooklyn.
C. M. Englis	Brooklyn.
Fischer & Lagno	Brooklyn.
Wm. J. & S. M. Gokey	Brooklyn.
Jakobson & Peterson	Brooklyn.
The Thos. Kells Sons' Co.	Brooklyn.
Thos. F. Meehan & Son	Brooklyn.
Morse Dry Dock & Repair Co.	Brooklyn.
N. Y. Dry Dock & Repair Co.	Brooklyn.
Robins Dry Dock & Repair Co.	Brooklyn.
Schuyler & Caddell	Brooklyn.
United States Navy Yard	Brooklyn.
John O'Day	Buffalo.
William Garratt	Canandaigua.
Wm. H. Lindley Co.	Canastota.
L. Leon Pio & Co.	Cape Vincent.
Cayuga Motor Boat Co.	Cayuga.
Mandus Peterson	Celoron.
H. Becker	Centerville.
G. W. Brown	Clayton.
Joel Couch	Clayton.
L. E. Fry & Co.	Clayton.
Henry Thibauh	Clayton.
Chas. H. Wilber	Clayton.
Department Public Works, State of New York	Cohoes.
Walter E. Abrams	Cold Spring Harbor.
C. Hiltebrant Dry Dock Co.	Connelly.

H. E. Lewis & Co.	Cooperstown.
W. R. Osborne	Croton-on-Hudson.
William M. Wilson	Deerland.
Estate of Michael Doran	Durhamville.
H. R. Savage	East Aurora.
J. Newton Hand	East Moriches.
Walter Southard	East Rockaway.
R. Vanderwalker	Fort Edward.
Fay & Brown Engraving Co	Geneva.
R. R. Norton	Glens Falls.
Bedell & Son	Glenwood Landing.
Fyfe & Hittorff	Glenwood Landing.
Otis Sinclair & Co	Good ground.
Albertson Construction Co	Greenport.
Fred C. Beebe	Greenport.
Eastern Shipyard Co	Greenport.
Greenport Basin & Construction Co	Greenport.
J. W. Ketcham	Greenport.
Tutthil & Thorn	Greenport.
Bert Tyler	Henderson Harbor.
James R. Bassett	Henderson Harbor.
Henry Brown	Henderson Harbor.
Atkin-Wheeler Co	Huntington.
Carter & Son	Jamesport.
G. T. Bouck	Jamestown.
Estate of John T. Wilson	Jamestown.
John S. Baisden & Co	Kingston.
R. Lanehan Co	Kingston.
Jacob Rice & Co	Kingston.
George & Bliss	Lake Placid.
David Swancott	Lee Center.
Lockport Dry Docks	Lockport.
Welin Marine Equipment Co	Long Island City.
Thaler Bros.	Lyons Falls.
Orienta Boat Yards	Mamaroneck.
S. F. Bannar	Marines' Harbor.
Brewer Dry Dock Co	Marines' Harbor.
Caddell Bros.	Marines' Harbor.
Alex. McDonald	Marines' Harbor.
Elmer D. Tuthill	Mattituck.
Gas Engine & Power Co., and Chas Seabury & Co. (Consolidated)	Morris Heights.
William Knapp	Narrowsburg.
T. S. Marvel Shipbuilding Co	Newburgh.
Robert R. Albertson	New Hamburg.
Stephenson & Stoneburg	New Rochelle.
T. R. Webber	New Rochelle.

William D. Dale	New York.
John P. Hawkins	New York.
Robert Jacob	New York.
McAllister Dry Dock & Ship Yard Co.	New York.
Frank McWilliams	New York.
W. F. Ruddock Yacht Works	New York.
Shewan & Sons	New York.
Spearin & Preston	New York.
Henry Steers (Inc.)	New York.
Jas. Tregarthen	New York.
Tregarther & Sons' Co	New York.
Wood & McClure	New York.
Jesse Carll	Northport.
Niagara Motor Boat Co	North Tonawanda.
Thompson, Hubman & Fisher	North Tonawanda.
St. Lawrence Marine Ry. Co	Ogdensburg.
Parsons Bros	Old Forge.
Fillmore A. Baker	Patchogue.
Geo. D. Bishop	Patchogue.
DeWitt S. Conklin	Patchogue.
G. M. Smith	Patchogue.
Martenus Smith	Patchogue.
S. C. Weeks & Co	Patchogue.
N. Y. A. C., Yachting Dept., Travers Island	Pelham Manor.
H. F. Tanner	Port Byron.
Jas. M. Bayles & Son	Port Jefferson.
D. B. Campbell	Port Jefferson.
John F. Hawkins	Port Jefferson.
Bull Bros.	Rochester.
William V. Long	Rochester.
Milton Boat Works	Rye.
G. H. Cleveland	Sag Harbor.
Wm. H. Martin	Saratoga Springs.
Frank Southard	Seaford.
L. S. Lacey	Sodus Center.
F. A. McMillian & Co	Sodus Point.
Daniel M. Corwin	South Jamesport.
E. M. Klock & Sons (Inc.)	Syracuse.
Edwin I. Rose	Tonawanda.
W. H. Fallette	Tonawanda.
A. C. Brown Sons	Tottenville.
Harry E. Cossey	Tottenville.
Jacob S. Elias & Sons	Tottenville.
H. R. Savage	Wales Center.
J. H. Hunt	Watervliet.
W. F. Summer	Wayne.
The Abram Walrath Co	Weedsport.

Waters Calver Co.	West New Brighton.
Frank McWilliams (Inc.)	West New Brighton.
Jelle Dykstra	West Sayville.
J. E. Rudolph	West Sayville.
John Ryan	Whitehall.
Thomas Fearon	Yonkers.

Boot and Shoe Findings.

Albany Last Co.	Albany.
O'Dell & Eddy Co.	Arcade.
Seger Prindle Mfg. Co.	Belvidere.
J. S. Charles	Bliss.
R. S. McNeill Co.	Brooklyn.
The O'Dell & Eddy Co.	Chaffee.
E. S. Sikes & Co.	Downsville.
Ellicottville Milling Co.	Ellicottville.
Fitzpatrick & Weller	Ellicottville.
Thos. F. McMahon	Ellicottville.
B. C. Beach	Elton.
E. R. Washburn	Franklinville.
J. E. Chase & Son	Great Valley.
N. L. Walrath	Great Valley.
Wm. J. Van Dewater Est	Machias.
McMahon & Hickey	Natural Bridge.
The New York Last Co.	New York City.
The Stewart Potter Co.	New York City.
Kingsley Bros.	Salisbury Center.
Land Roller Mfg. Co.	Sandusky.
Wanakena Last Co.	Wanakena.
F. A. Capron	West Valley.
T. F. Kruse	West Valley.
The O'Dell & Eddy Co.	Yorkshire.

Boxes, Cigar.

Binghamton Cigar Box Co.	Binghamton.
Lacey's Cigar Box Co.	Binghamton.
F. B. & J. W. Lacey	Binghamton.
C. E. Rogers, Jr.	Brooklyn.
Uptegrove Cigar Box Lumber Co.	Brooklyn.
Chas. Riesterholz	Buffalo.
Adam Sauer	Buffalo.
F. M. Howell & Co.	Elmira.
Philip Fehl	Hudson.
W. F. Classen	Lyons.
Nic. Althaus Co.	New York City.
Bubeck & Guerin	New York City.
S. Elkeles Cigar Box Co.	New York City.

Grausam & Sachs	New York City.
James P. Prendergast	New York City.
Schwarzkopf & Ruckert	New York City.
S. Sladkers	New York City.
Chas. Stultz Co	New York City.
J. C. Van Brunt & Sons	New York City.
Louis Walter	New York City.
Martin Hengstler	Syracuse.
H. A. Wolfram	Watervliet.

Boxes and Crates, Packing.

Smith Bros.	Addison.
Annesley & Co	Albany.
Henry W. Draper	Albany.
T. F. Romeyn Co	Albany.
Willson & Eaton Co	Amenia.
Henry C. Grieme Co	Amsterdam.
O'Dell & Eddy Co	Arcade.
A. M. Eiland	Arkport.
Westinghouse Machine Co	Attica.
Henry & Allen	Auburn.
David Wadsworth & Son	Auburn.
W. R. Prouty	Bainbridge.
L. W. Keeler & Sons	Bangor.
G. Gale & Son	Barnerville.
Chas. Quackenbush	Barnerville.
Johnston Harvester Co	Batavia.
Batavia & New York Woodworking Co	Batavia.
Wiard Plow Co	Batavia.
Raymond Mfg. Co	Bath.
W. J. Cowee	Berlin.
Big Indian Wood Products Co., Ltd	Big Indian.
Binghamton Lounge Co	Binghamton.
Osgood Scale Co	Binghamton.
Sturtevant-Larrabee Co	Binghamton.
Wilkinson Mfg. Co	Binghamton.
Bliss Mfg. Co	Bliss.
Milford Calkins	Brant.
Brocton Furniture Co	Brocton.
Louis Bossert & Son	Brooklyn.
Brooklyn Cooperage Co	Brooklyn.
Jas. H. Dykeman	Brooklyn.
John A. Eckert	Brooklyn.
Eclipse Box & Lumber Co	Brooklyn.
Frederick Elflein & Sons	Brooklyn.
Foster Pump Works	Brooklyn.
The J. Friedland Co	Brooklyn.

Gluck Bros.	Brooklyn.
Samuel Greenstein	Brooklyn.
John Kroder & Henry Reubel Co.	Brooklyn.
C. H. Medicus & Co.	Brooklyn.
National Packing Box Co.	Brooklyn.
N. Y. Bottle Box Co.	Brooklyn.
G. H. Reeves, Inc.	Brooklyn.
Second Ave. Planing Mill & Box Factory.	Brooklyn.
South Brooklyn Box Factory.	Brooklyn.
Edward C. Smith.	Brooklyn.
Wood Packing Box Co.	Brooklyn.
Zimmerman & Voight.	Brooklyn.
American Radiator Co.	Buffalo.
American Seating Co.	Buffalo.
M. J. Bernhard.	Buffalo.
Buffalo Lounge Co.	Buffalo.
Buffalo Radiator Co.	Buffalo.
Cutler Desk Co.	Buffalo.
Cutting Furniture Co.	Buffalo.
Cyphers Incubator Co.	Buffalo.
A. Dutch & Co.	Buffalo.
Eagle Printing Ink Co.	Buffalo.
G. Elias & Bro.	Buffalo.
Robt. Essex Incubator Co.	Buffalo.
Graves, Manbert, George & Co.	Buffalo.
Heinz & Munschauer.	Buffalo.
The Hill Mfg. Co.	Buffalo.
Wm. J. Hines, Jr.	Buffalo.
Jacob Jaeckle Furniture Co.	Buffalo.
C. Kurtzman & Co.	Buffalo.
MacLean Box Factory.	Buffalo.
McKinnon Dash Co.	Buffalo.
Niagara Box Co.	Buffalo.
Pierce Arrow Motor Car Co.	Buffalo.
Pratt & Leftwich Co.	Buffalo.
Adam Sauer	Buffalo.
Sikes Chair Co.	Buffalo.
Steul & Thurman Co.	Buffalo.
W. P. Taylor & Co.	Buffalo.
E. R. Thomas Motor Car Co.	Buffalo.
M. Zeis & Sons.	Buffalo.
F. H. Conant Sons.	Camden.
C. T. Meeker.	Camden.
Louis Perrin.	Camden.
Walter W. Russel.	Camden.
John M. Young & Son.	Camden.
F. P. Lindeman & Son.	Cameron.

Lisk Mfg. Co.	Canandaigua.
Canastota Couch Co.	Canastota.
Ellis, Joyce & Hildreth.	Canastota.
Steuben Lumber & Furniture Co.	Canisteo.
J. A. Scobell.	Cape Vincent.
L. Knott & Co.	Cassadaga.
A. C. Cheney Piano Action Co.	Castleton.
Climax Mfg. Co.	Castorland.
Oakes & Burger.	Cattaraugus.
The O'Dell & Eddy Co.	Chafee.
Clayville Knitting Co.	Clayville.
L. C. Brown.	Clifton.
Judd & Leland Mfg. Co.	Clifton Springs.
M. Breault & Co.	Cohoes.
Hudson River Box Co.	Cohoes.
J. S. Twinning Estate.	Copenhagen.
Cortland Cabinet Co.	Cortland.
Cortland Carriage Goods Co.	Cortland.
Wickwire Bros., Inc.	Cortland.
American Valve Co.	Coxsackie.
Croton Mfg. Co.	Croton Falls.
Clinton Prison	Dannemora.
Geo. F. Scott.	Dansville.
Racine Thompson	De Peyster.
Julius Breckwoldt & Co.	Dolgeville.
Fred B. Chapin.	Dolgeville.
Goble Bros.	Dundee.
Frank Elliocott	Eagle Harbor.
Cornell Table Co.	Earlville.
The Wiard Mfg. Co.	East Avon.
Hanford Bros.	East Meredith.
M. E. True & Son.	East Pembroke.
Ontario Drill Co.	East Rochester.
Dwight Divine & Sons.	Ellenville.
Borden's Condensed Milk.	Ellicottville.
American-LaFrance Fire Engine Co.	Elmira.
Diven Mfg. Co.	Elmira.
Elmira Table Mfg. Co.	Elmira Heights.
Eureka Moulding Co.	Elmira.
Field Force Pump Co.	Elmira.
Essex Horse Nail Co., Ltd.	Essex.
S. N. Smith & Son.	Eureka.
C. J. Peters.	Fabius.
Cobb Preserving Co.	Fairport.
American Mfg. Concern.	Falconer.
Bausch Picture Frame & Molding Co.	Farmingdale.
Dutchess Hat Works.	Fishkill-on-the-Hudson.

Dutchess Tool Co.	Fishkill-on-the-Hudson.
Bailey Knitting Mills	Fort Plain.
Century Cabinet Co.	Fort Plain.
Acme Road Machinery Co.	Frankfort.
Franklinville Canning Co.	Franklinville.
E. J. Turk	Fredonia.
Chas. M. Allen	Fulton.
Dilts Machine Works	Fulton.
Empire Cooping Co.	Fultonville.
White Mop Wringer Co.	Fultonville.
Doubleday, Page & Co.	Garden City.
Geneva Wagon Co.	Geneva.
Kendrick & Brown Co.	Glens Falls.
John S. Jones	Greenfield Center.
Monarch Road Roller Co.	Groton.
Groton Typewriter Co.	Groton.
Henry A. Hart	Hagedorns Mills.
Hamburg Planing Mill Co.	Hamburg.
Hamilton Lumber Co.	Hamilton.
Hammondsport Box Factory	Hammondsport.
W. A. Perkins	Harford Mlls.
The National Conduit & Cable Co.	Hastings-on-Hudson.
American Aeroplane Supply House	Hempstead.
F. E. Hale Mfg. Co.	Herkimer.
Horrocks Desk Co.	Herkimer.
Wagner Couch Co.	Herkimer.
West Canada Lumber Co.	Herkimer.
Geo. W. Pratt & Son	Highland.
Holland Planing Mill Co.	Holland.
Walter A. Wood Mowing & Reaping Mach. Co.	Hoosick Falls.
J. M. Deutsch Co.	Hornell.
McConnell Mfg. Co.	Hornell.
F. L. Casper & Sons	Howe Cave.
Louis Winstran	Hudson.
Kenyon Lumber Co.	Hudson Falls.
Remington Arms & Ammunition Co.	Ilion.
Remington Typewriter Co.	Ilion.
A. N. Russell & Sons Co.	Ilion.
The Blackstone Mfg. Co.	Jamestown.
Cadwell Cabinet Co.	Jamestown
Dahlstrom Metallic Door Co.	Jamestown.
Elite Furniture Co.	Jamestown.
Empire Case Goods Co.	Jamestown.
Globe Cabinet Co.	Jamestown.
Himebaugh Bros.	Jamestown.
Jamestown Table Co.	Jamestown.

Maddox Table Co.	Jamestown.
Marvel Furniture Co.	Jamestown.
Seaburg Mfg. Co.	Jamestown.
Shearman Bros. Co.	Jamestown.
Star Furniture Co.	Jamestown.
Watson Mfg. Co.	Jamestown.
Richardson & Co.	Java Village
L. Stephenson	Johnstown.
Younglove Lumber Co.	Johnstown.
Carr, Egelston & Riz.	Kendall.
Hendricks Hay Press Co.	Kingston.
Hercules Metal Corner Co.	Kingston.
Traphagen & Hull Mfg. Co.	Kingston.
Universal Road Machinery Co.	Kingston.
Lancaster Machine & Knife Co.	Lancaster.
G. W. Ainslie.	Laurens.
Lestershire Lumber & Box Co.	Lestershire.
D. H. Burrell & Co.	Little Falls.
Jacob Dettinger & Son.	Little Falls.
The C. J. Lundstrom Mfg. Co.	Little Falls.
Evans & Co.	Lockport.
Frontier Box & Mfg. Co.	Lockport.
Lockport Box & Lumber Co.	Lockport.
Merritt Mfg. Co.	Lockport.
W. W. Taylor	Lockport.
John C. Webb.	Lockport.
General Vehicle Co.	Long Island City.
Klein Bros.	Long Island City.
Asbestos Burial Casket Co.	Lowville.
George W. Buisch & Son.	Lyons.
Frank S. Hardin Co.	McConnellsville.
Central Paper Box Co.	McGraw.
McGraw Mfg. Co.	McGraw.
S. Cheney & Sons.	Manlius.
E. U. Scoville Co.	Manlius.
Franklin Clark	Marlboro.
William Carroll & Co.	Matteawan.
Freen Fuel Economizer Co.	Matteawan.
Matteawan Mfg. Co.	Matteawan.
William Barber	Mechanicsville.
W. Va. Pulp & Paper Co.	Mechanicsville.
S. A. Cook & Co.	Medina.
J. W. Jackson & Co.	Medina.
Maher Bros. Co.	Medina.
Monitor Clock Works.	Medina.
Majestic Furniture Co.	Mexico.
Myron G. Allen.	Middle Granville.

The Union Hat Co.	Middletown.
Augustine Kaley	Milton.
W. H. Townsend	Milton.
Shepard Elec. Crane & Hoist Co.	Montour Falls.
Gas Engine & Power Co., and Chas. Seabury & Co. (Consolidated)	Morris Heights.
Martin & Stecher	Nanuet.
Grubb and Kosegarten Bros.	Nassau.
Camp Bros. Mfg. Co.	New Berlin.
Caldwell Lawn Mower Co.	Newburgh.
S. N. Keener Co.	Newark.
F. R. Abbey	New York.
Advance Box Co.	New York.
American Hard Rubber Co.	New York.
American Piano Co.	New York.
E. J. Armstrong	New York.
Artists Packing & Shipping Co.	New York.
L. Baldasky	New York.
Frederick Base	New York.
Fred Bieg	New York.
Charles F. Biele & Sons Co.	New York.
Bohn Syphon Refrigerator Co.	New York.
I. N. Burdick	New York.
Jabez Burns & Sons	New York.
Carroll Box & Lumber Co.	New York.
Library Bureau	New York.
Ronalds & Johnson Co.	New York.
Doernberg & Goodman	New York.
John Dunbar Co., Inc.	New York.
Dunbar Box & Lumber Co.	New York.
Epstein & Vollweiler	New York.
James Fagan & Son	New York.
Feldman Packing Box Co.	New York.
J. H. Fitzgerald	New York.
Forest Box & Lumber Co.	New York.
E. Gerow	New York.
J. A. Gilmour	New York.
M. Gottlieb & Sons	New York.
Greenfield Box Co.	New York.
Thos. Harrington & Co.	New York.
John Helmsky	New York.
H. Henmann Furniture Co.	New York.
Hill & Newmann Co.	New York.
H. F. Huber & Co.	New York.
Geo. Hunzinger & Son	New York.
Kaffenberger & Cantor Co.	New York.
George Kidney	New York.

Knickerbocker Box & Lumber Co.	New York.
Chas. Kern	New York.
S. Liebovitz & Sons	New York.
Thos. J. Locke & Son	New York.
Peter J. Lowell	New York.
L. H. Mace & Co. (Inc.)	New York.
Manhattan Box Co.	New York.
Marks Adjustable Chair Co.	New York.
Alfred B. Marx & Bro.	New York.
McConnell Mfg. Co.	New York.
John Mills & Son	New York.
Terrance Montague	New York.
John E. Moore	New York.
John Neeley & Son	New York.
G. G. Newcomb Mfg. Co.	New York.
Palmer & Embury Mfg. Co.	New York.
T. G. Patterson Lumber Co.	New York.
Potter & Stymus Co.	New York.
Paul Pratho, Jr.	New York.
J. Rathman	New York.
Reddis Lumber & Veneer Co.	New York.
Riddick & Co.	New York.
Rosenthal & Cohen	New York.
L. H. Russell (box manufacturers)	New York.
P. Ryan	New York.
Theodore Sauer Co.	New York.
Schwab Bros. Co.	New York.
Star Box Co.	New York.
United Box Co.	New York.
F. Vogel & Co.	New York.
James G. Wilson Mfg. Co.	New York.
S. W. Johnson & Son	Nichols.
Hobbs Bros.	Nineveh.
J. P. Manufacturing Co.	Niverville.
Remington Martin Co.	Norfolk.
William H. Plumb & Son	North Bangor.
J. A. Falk	North Collins.
F. I. Alliger	North Tonawanda.
W. H. Crabb	North Tonawanda.
Dock & Mill Co.	North Tonawanda.
North Tonawanda Musical Instrument Works	North Tonawanda.
White, Gratwick & Mitchell	North Tonawanda.
Rudolph Wurlitzer Mfg. Co.	North Tonawanda.
Foote Mfg. Co.	Nunda.
Odessa Mfg. Co.	Odessa.
Acme Glass Co.	Olean.
Olean Glass Co.	Olean.

Lee Chair Co	Oneida.
Oneida Steel Pulley Co	Oneida.
Schubert Bros. Gear Co	Oneida.
Frank Clevenger	Ontario.
R. J. Eaton	Ontario.
Orchard Park Planing Mill Co	Orchard Park.
Hatheway & Reynolds	Oriskany Falls.
H. Waterbury & Sons Co	Oriskany Falls.
National Starch Co	Oswego.
Standard Oil Co	Oswego.
Ingersol Rand Co	Painted Post.
The Gerlock Packing Co	Palmyra.
Peekskill Hat Mfg. Co	Peekskill.
Jas. S. Lord	Penfield.
Yates Lumber Co	Penn Yan.
Perry Knitting Co	Perry.
Crown Mfg. Co	Phelps.
W. M. Powers	Pike.
Pine Hill Crystal Spring Water Co	Pine Hill.
Lozier Motor Co	Plattsburg.
Stillman & Co	Poland.
Anchor Bolt & Nut Co	Poughkeepsie.
De Laval Separator Machine Co	Poughkeepsie.
Salmon River Table Co	Pulaski.
Frank C. Huyck & Sons	Rensselaer.
Morrison Blair	Rensselaer Falls.
American Laundry & Machinery Mfg. Co	Rochester.
American Piano Co	Rochester.
American Wood Working Machinery Co	Rochester.
Archer Mfg. Co	Rochester.
Barnard & Simonds Co	Rochester.
Brooks Furniture Mfg. Co	Rochester.
Cooperative Foundry Co	Rochester.
General Railway Signal Co	Rochester.
John A. Hartfelder	Rochester.
John C. Heughes	Rochester.
Lengslow Fowler Co	Rochester.
Henry Likely & Co	Rochester.
Geo. J. Michelsen Furniture Co	Rochester.
Miller Cabinet Co	Rochester.
Chas. K. Newberry	Rochester.
Rochester Show Case Works	Rochester.
Stromberg Carlson Tel. Mfg. Co	Rochester.
Sullivan Bros.	Rochester.
Traders Box & Lumber Co	Rochester.
Wood Working Machinery Co	Rochester.
Yawman & Erbe Mfg. Co	Rochester.

Beach Lumber Co.	Rome.
D. J. Blasier	Rome.
Rome Box & Lumber Co.	Rome.
Millard Lumber Co.	Rouses Point.
Joseph Fahys & Co.	Sag Harbor.
Wood Fibre Box Co.	Sanborn.
John J. Koons	Saratoga Springs.
Chas. B. Davis	Savona.
Briercliff Greenhouses	Scarboro.
General Electric Co.	Schenectady.
The Gould Mfg. Co.	Seneca Falls.
Rumsey & Co., Ltd.	Seneca Falls.
Maple Chair Co.	Shandaken.
Paper Machine Co.	Shortsville.
A. J. Henpel	Silver Creek.
Huntley Mfg. Co.	Silver Creek.
Invincible Grain Cleaner Co.	Silver Creek.
H. J. Montgomery Mfg. Co.	Silver Creek.
Brown & Kearney Mfg. Co.	Silver Springs.
Norman B. Sheppard	Skaneateles.
F. K. Hallett	Smithville.
B. F. Gladding & Co.	So. Otselic.
Boomer & Boschort Press Co.	Syracuse.
C. G. Brown Furniture Co.	Syracuse.
J. I. Case Threshing Machinery Co.	Syracuse.
O. M. Edwards Co.	Syracuse.
The Engelburg Huller Co.	Syracuse.
Gould Storage Battery Co.	Syracuse.
John H. Lyons	Syracuse.
Markert Mfg. Co.	Syracuse.
P. B. & H. Molding Co.	Syracuse.
The Piquet Box & Lumber Co.	Syracuse.
Quaint Art Furniture Co.	Syracuse.
E. C. Stearns & Co.	Syracuse.
Gustav Stickley Co.	Syracuse.
Syracuse Chilled Plow Co.	Syracuse.
Syracuse Glass Co.	Syracuse.
Maxwell Briscoe Motor Co.	Tarrytown.
G. F. Dudley & Co.	Ticonderoga.
R. P. & L. R. Mead	Ticonderoga.
Wilson Lumber & Box Co.	Tonawanda.
Cluett, Peabody & Co.	Troy.
Troy Box & Lumber Co.	Troy.
United Shirt & Collar Co.	Troy.
Norwood Mfg. Co.	Tupper Lake.
Wm. Vail's Sons	Vail Mills.
The N. A. Tyler Lumber Co.	Vernon.

Scott E. Phinney	Wadhams.
Rider Ericsson Engine Co	Walden.
Garner Print Works & Bleachers	Wappingers Falls.
Rice & Woodward	Warrensburg.
Warsaw Wilkinson Co	Warsaw.
Waterloo Wagon Co	Waterloo.
Excelsior Carriage Co	Watertown.
Harman Machine Co	Watertown.
Union Carriage & Gear Co	Watertown.
H. A. Wolfram	Watervliet.
Plail Bros.	Wayland.
The Abram Walwrath Co	Weedsport.
A. G. Houser	West Branch.
D. N. Morse	Westfield.
C. G. & J. R. Wellington	West Stockholm.
W. S. Allen Mfg. Co	Whitney Point.
Otselic Mfg. Co	Whitney Point.
LaLance & Grosjean Mfg. Co	Woodhaven.
Otis Elevator Co	Yonkers.

Brushes and Brooms.

L. Noiller's Sons	Buffalo.
Codosia Mfg. Co	Codosia.
Robert Fisk	Crown Point Center.
H. R. Savage	East Aurora.
George Mehrmann	Elmsford.
Gifford Lumber Co	Glens Falls.
John Morrison	Glens Falls.
Barton & Keenan	Hague.
H. A. Williams	Hancock.
Herbert Brush Mfg. Co	Kingston.
Henry Peake	Long Eddy.
Henry Peck	Long Eddy.
Oskar Martin	Nannet.
J. C. White	Newburgh.
S. W. Johnson & Son	Nichols.
United States Brush Co	Potsdam.
Geo. P. Bortle	Rochester.
A. L. Sonn Brush Co	Troy.
H. R. Savage	Wales Center.

Car Construction.

Pittsburg, Shawmut & Northern R. R. Car Shops.	Angelica.
American Car & Foundry Co	Buffalo.
Pennsylvania R. R. Co	Buffalo.
Pullman Co.	Buffalo.
The American Locomotive Co	Dunkirk.

Northern Central Ry. Co.	Elmira.
L. I. R. R. (Richmond Hill Branch) Car Shops.	Jamaica.
Boston & Maine R. R. Shops.	Mechanicsville.
Creek Lumber Co.	Middleburg.
N. Y., O. & West. R. R. Co.	Middletown.
New York Central & Hudson River R. R.	New York City.
J. P. Sjoberg Co.	New York City.
Pennsylvania R. R. Co.	Olean.
Merchants' Transportation & Despatch Co.	East Rochester.
Rochester, Buffalo & Pittsburg Ry.	Rochester.
S. N. Skinner & Son.	Rockdale.
American Locomotive Co.	Schenectady.
Lehigh & Hudson River Ry. Co.	Warwick.
Del. & Hudson R. R. Car Shops.	Watervliet.
J. M. Jones' Sons Co.	Watervliet.

Caskets and Coffins.

Albany Casket Co.	Albany.
Astoria Casket Co.	Astoria.
Morgan Casket Co.	Brooklyn.
New York & Brooklyn Casket Co.	Brooklyn.
Central Casket Co.	Buffalo.
Wm. Bihl	Central Islip.
M. B. Hawley.	Colton.
Elmira Door & Supply Co.	Elmira.
Asbestos Burial Casket Co.	Lowville.
Kiechman & Co.	New York City.
Hornthal & Co.	New York City.
J. & J. W. Holts.	New York City.
H. E. Taylor & Co.	New York City.
Norwood Casket Co.	Norwood.
Nunda Casket Co.	Nunda.
National Casket Co.	Oneida.
National Casket Co.	Rochester.
John Marsellus Mfg. Co.	Syracuse.
Monroe Mfg. Co.	Webster.
O'Dell Bros.	Webster.
F. L. Knowles Casket Co.	Wellsville.

Chairs.

B. J. Harrison Mfg. Co.	Arkville.
Peter Fry	Ava.
Horton Lumber Co.	Altmar.
Binghamton Chair Co.	Binghamton.
Seele & Ahl Co.	Binghamton.
Black River Bending Co.	Black River.
H. C. Dexter Chair Co.	Black River.

C. H. Trevett	Broadalbin.
P. C. Trevett	Broadalbin.
Gott-Weber & Co	Brooklyn.
Buffalo Chair Works	Buffalo.
The Hill Mfg. Co	Buffalo.
Sikes Chair Co	Buffalo.
F. H. Conant's Sons	Camden.
John M. Young & Son	Camden.
Canastota Couch Co	Canastota.
Jefferson Chair Co	Carthage.
C. J. Armstrong & Sons	Cherry Valley.
S. Cooper	Clifton.
Rhodes Chair Co	Cold Brook.
E. H. Benway & Co	Corinth.
Clinton Prison	Dannemora.
The Geo. Arndt Chair Co	Dansville.
A. L. Harris	East Nassau.
Elbridge Chair Co	Elbridge.
Lobdell Bros.	Elizabethtown.
Geo. W. Dibbell	Elka Park.
Walter Stone & Co	Hadley.
O. E. Sism	Hagedorns Mills.
Louis Winstian	Hudson.
Jamestown Chair Co	Jamestown.
Jamestown Lounge Co	Jamestown.
Shearman Bros. Co	Jamestown.
H. S. Lane	Lanesville.
The Adler Veneer Seat Co	Long Island City.
Mattville Chair Works Inc	Mattville.
Wright Convertible Chair Co	Madrid.
S. A. Cook & Co	Medina.
Maher Bros. Co	Medina.
Majestic Furniture Co	Mexico.
Creek Lumber Co	Middleburg.
C. J. Armstrong & Sons	Milford.
R. M. Wagan & Co	Mt. Lebanon.
Frank Eckes Mfg. Co	Mt. Tremper.
Wilson & Adams	Mt. Vernon.
A. J. Benjamin	Morris.
Jacob Dieter & Sons Co	New York City.
Geo. Huzinger & Son	New York City.
Metropolitan Chair Co	New York City.
John Mills & Son	New York City.
New York Chair Co	New York City.
Geo. T. Sargent Co	New York City.
G. Wagman	New York City.
Lee Chair Co	Oneida.

W. H. Lattimer & Sons	Orwell.
Archer Mfg. Co	Rochester.
Barnard & Simonds Co	Rochester.
Hubbard, Eldridge & Miller	Rochester.
Langslow Fowler Co	Rochester.
Chas. K. Newbery	Rochester.
Indian River Chair Co	Philadelphia.
Sinclair Chair Co	Phœnix.
F. B. Woodbury	Phœnix.
The Chichester Bros. Chair Co	Poughkeepsie.
Kall Rock Chair Co	Poughkeepsie.
Poughkeepsie Chair Co	Poughkeepsie.
Frank Collins, jr	Saranac.
Maple Chair Co	Shandaken.
Sidney Novelty Co	Sidney.
Peter Koford	Silver Creek.
H. J. Montgomery Mfg. Co	Silver Creek.
Barnaby Furniture Co., Inc	Stapleton.
A. D. Scribner	Stony Creek.
Walter Stone & Son	Stony Creek.
The Elgin A. Simonds Co	Syracuse.
Henry Schneider & Co	Troy.
W. H. Gunlocks Chair Co	Wayland.
Plail Bros	Wayland.
W. E. Sprague	Westdale.
H. C. Burnell	Westport.

Clocks.

The Ansonia Clock Co	Brooklyn.
Ithaca Calendar Clock Co	Ithaca.
Monitor Clock Works	Medina.

Dairymen's, Poulterers', and Apiarists' Supplies.

Spies Basket Co	Adams.
Carl W. Savage	Alden.
F. W. Howard	Alfred.
R. W. Savage & Son	Akron.
Geo. Calhoon & Co	Andover.
W. S. Brooks	Antwerp.
The Arcade Planing Mill Co	Arcade.
Glor Bras Willis Mfg. Co	Attica.
Chas. Oper	Ava.
G. Gale & Son	Barnerville.
C. Quackenbush	Barnerville.
Chas. E. Snell	Black River.
Edward Beadle	Boiceville.
David Kailen	Boonville.

Robt. Essex Incubator Co	Buffalo.
Cyphers Incubator Co	Buffalo.
S. L. Kelsey	Burlington.
H. Wallace & Son	Canton.
Oakes & Burges	Cattaraugus.
Setter Bros. Co	Cattaraugus.
W. F. Stetson Co	Cherry Creek.
Meldrim Bros	Cincinnatus.
John C. Davis	Cold Brook.
C. H. Payne	Cold Brook.
A. J. Ward	Copenhagen.
G. M. Watson	Cortland.
Jas. H. Steiner	Croghan.
Cuba Cheesebox Co	Cuba.
Stanley C. Swift Mfg. Co	Cuba.
Wasson Stanchion Co	Cuba.
A. J. Kidder	Darien Center.
Sternberg Bros	Depauville.
C. E. Giffin	De Peyster.
Racine Thompson	De Peyster.
B. L. Orcutt & Sons	Dickinson Center.
H. R. Savage	East Aurora.
James Keating	East Florence.
O. Hawkins	East Otto.
Fred Woodmancy	East Randolph.
American Mfg. Concern	Falconer.
A. A. French	Felts Mills.
Mason-Young Co	Fillmore.
Z. L. Tompkins	Florence.
Chas. R. Hayes	Forestport.
A. E. Ober	Fort Jackson.
Hollenbeck & Coolidge	Fort Jackson.
Eugene Simpkins	Freehold.
D. E. Mason	Fulton.
Empire Cooping Co	Fultonville.
R. G. Jones	Glenmore.
Block Bros. & Co	Great Valley.
J. E. Gould	Greene.
Lyons Iron Works	Greene.
W. O. Slocum	Greenwood.
G. B. Gerard	Holland Patent.
Edward L. Gossett	Jamestown.
W. S. Sammons	Johnstown.
Allyn E. Greene	Lee Center.
F. C. Rogers	Le Roy.
D. H. Burrell & Co	Little Falls.
The Hall Mammoth Incubator Co	Little Falls.

Gould Lumber Co.	Long Eddy.
Geo. A. Courbat.	Mallory.
D. S. Mawson.	Manlius.
Chas. A. Van Wormer.	Mannsville.
G. H. Whittaker.	Marcy.
William S. Lawrence.	Moira.
W. N. Cardner.	New Woodstock.
Charles E. Gue.	North Western.
Landon & Green.	Odgensburg.
Fred Babcock.	Orwell.
Joseph Kopydloske.	Otto.
G. V. Storie.	Oxbow.
St. Regis Mfg. Co.	Parishville.
Will C. Andrus.	Pitcher.
Self-Locking Stanchion Co.	Postville.
The DeLaval Cream Separator Mch. Co.	Poughkeepsie.
Lown & Son.	Poughkeepsie.
Morrison & Blair.	Rensselaer Falls.
Chase Mills & Supplies.	Richfield Springs.
Rochester Box & Lumber Co.	Rochester.
Star Egg Carrier & Tray Mfg. Co.	Rochester.
Hart & Beebe.	Rose Hill.
G. S. Dudley.	Roxbury.
A. M. Tarbell.	Rushford.
John J. Koons.	Saratoga Springs.
Geo. N. Sides.	Schenevus.
G. A. Clark & Co.	Sidney.
William H. Webler.	Sodus Center.
C. W. Kellogg.	Springville.
Gordon W. Stetson.	Stockwell.
Meldrim Bros.	Truxton.
D. S. Tilyon.	VanHornesville.
W. L. Spink.	Varysburg.
H. R. Savage.	Wales Center.
Peter Boardway.	West Bangor.
G. W. Southworth.	West Exeter.
T. J. Dugdale.	West Galway.
Henry Rimiller & Son.	West Leyden.
Geo. N. Gibson & Son.	West Stockholm.
T. F. Kruse.	West Valley.
A. C. Hackley.	West Winfield.
C. T. Dickinson.	Whitney Point.
Otselic Mfg. Co.	Whitney Point.

Dowels.

J. M. Peter's Sons.	Bleecker.
Charles Rohlfs.	Buffalo.

C. J. Peters	Fabius.
Glenfield Mfg. Co	Glenfield.
Geo. P. Butte Co	Rochester.
Kingsley Bros	Salisbury Center.
Gould Storage Battery Co	Syracuse.
Plail Bros	Wayland.

Elevators.

C. W. Smith	Buffalo.
Otis Elevator Co	Buffalo.
M. Cullen	New York.
Anton Larsen & Co	New York.
Bardsley Bros	New York.
Perry & Son	New York.
William Williams Co	New York.
Warsaw Elevator Co	Warsaw.
Otis Elevator Co	Yonkers.

Equipment, Playground.

James F. Wilbur	Berkshire.
Evans & Co	Lockport.
E. D. Shaver	Niverville.
Herschel-Spillman Co	N. Tonawanda.
W. H. Lattimer & Sons	Orwell.

Excelsior.

F. P. Linderman & Son	Cameron.
Chateaugay Excelsior Co	Chateaugay.
Globe Excelsior Co	Chateaugay.
Star Excelsior Co	Chateaugay.
E. H. Penway & Co	Corinth.
East Branch Excelsior Co	East Branch.
The Edwards Excelsior Mills	Edwards.
F. M. Blystone	Elmira.
C. W. Denesia	Evans Mills.
Chas. M. Allen	Fulton.
J. K. Hornbeck & Co	Hancock.
Cottle Bros	Hart Lot.
Brant Excelsior Co	Hawkinsville.
National Desk Co	Herkimer.
Standard Furniture Co	Herkimer.
Albert Scribner	Knoelhurst.
L. L. Hall	Knoelhurst.
C. N. Morse	Lackawack.
Fenton & Dence	Lowville.
Chas. Harden	McConnellsville.
Cantwell & Wilson	Malone.

Malone Excelsior Co	Malone.
George L. Lyon	Milford.
Daniel Lynch	Minerva.
F. E. Sheffield	Mooers.
H. J. Weiden	Neweiden.
North River Mfg. Co	North Creek.
Gormley Bros	Phœnicia.
Jesse H. Wilder	Petries Corner, Lewis Co.
George H. Carroll & Co	Plattsburg.
Port Leyden Excelsior Co	Port Leyden.
Frank A. Hull & Sons	Southfield.
Lee L. Hall	Stony Creek.
A. D. Scribner	Stony Creek.
Harry Cunningham	Warrensburg.
Arthur V. Hornbeck	Warwaising.

Firearms.

G. Elias & Bros	Buffalo.
Remington Arms & Ammunition Co	Illion.
Ithaca Gun Co	Ithaca.

Fixtures.

Laib Bros	Albany.
George Spalt	Albany.
Chris. S. Mergell	Amityville.
American Show Case Co	Brooklyn.
Frederick Efflein & Sons	Brooklyn.
C. B. French Cabinet Co	Brooklyn.
Greiner Construction Co	Brooklyn.
E. Hamburger & Co	Brooklyn.
F. H. Helford & Co	Brooklyn.
Manhattan Cabinet Works	Brooklyn.
Schwartz & Co	Brooklyn.
N. S. Scott Co	Brooklyn.
Wm. F. Worn & Co	Brooklyn.
American Seating Co	Buffalo.
M. J. Bernhard	Buffalo.
A. Dutch & Co	Buffalo.
H. W. Kruse	Buffalo.
Chas. Rohlfs	Buffalo.
J. B. Rice Seed Co	Cambridge.
Wm. O. Schwartzwaelder	Chichester.
J. W. Storandt Mfg. Co	Gates.
A. N. Russell & Sons Co	Illion.
Nelson Bros	Jamestown.
Wilson & Adams	Mt. Vernon.
Bardsley Bros. Co	New York.
Amman Mfg. and Construction Co	New York.

Bardsley Bros. Co.	New York.
Becker & Korb	New York.
The Brunswick-Balke-Collender Co.	New York.
Demarest & Eckerson	New York.
Drossin Bros.	New York.
Joseph Feldman	New York.
Gustave Frank	New York.
The J. Friedland Co.	New York.
Jacob Froehlich Cabinet Works	New York.
Martin T. Garvey	New York.
Glassburg & Cantner	New York.
William Kleeman & Co.	New York.
Klingle Mfg. Co.	New York.
David Kramer	New York.
J. & R. Lamb	New York.
Samuel Lakow	New York.
Manhattan Office Partition Co.	New York.
Manhattan Show Case Co.	New York.
National Show Case Co.	New York.
N. Y. Store Fixture Co.	New York.
Perry & Son	New York.
Chas. E. Reynolds	New York.
Ely J. Riesser & Co.	New York.
Arthur J. Riesser & Co.	New York.
C. Reiger's Sons Inc.	New York.
Glasser Rohrer & Co.	New York.
Roth & Co.	New York.
Seger & Gross Co.	New York.
Robert Wick Lumber Co.	New York.
Wicker Lumber Co.	Niagara Falls.
Walker Bin Co.	Penn Yan.
Beardsley Lumber Co.	Port Jervis.
Archer Mfg. Co.	Rochester.
John Hoffman Co.	Rochester.
J. H. Reinhard & Son	Rochester.
Rochester Cabinet Co.	Rochester.
Rochester Show Case Works	Rochester.
J. W. Storandt Mfg. Co.	Rochester.
Richard Wickham, Jr.	Schenectady.
Vasburg Bros.	Shady.
Sidney Novelty Co.	Sidney.
Doxtader & Wilcoxen	Syracuse.
Fixture & Lumber Co.	Watkins.
James F. Young	Watervliet.

Frames and Mouldings, Picture.

Jas. Cantwell	Amber.
American Moulding Co	Brooklyn.
Brooklyn Carving Works	Brooklyn.
John H. Gass Son's	Brooklyn.
Greenpoint Moulding Co	Brooklyn.
Eagle Moulding Co	Brooklyn.
John Hughes Son	Brooklyn.
Union Mill Co	Brooklyn.
Zimmerman & Voigt	Brooklyn.
Empire Moulding Co	Brooklyn.
Henry G. White	Buffalo.
Bausch Picture Frame & Moulding Co	Farmingdale.
D. Milch	New York.
J. Bosowsky	New York.
J. N. Budick	New York.
Wm. Klein	New York.
Klingle Mfg. Co	New York.
National Moulding Co	New York.
F. J. Newcomb Mfg. Co	New York.
New York Carved Moulding Co	New York.
S. & R. Frame Mfg. Co	New York.
Tremont Moulding Mill	New York.
Ullman Mfg. Co	New York.
Western Frame Co	New York.
G. Wuerth Mfg. Co	New York.
Zubinsky Bros	New York.
United States Brush Co	Potsdam.
J. W. Gillis Co	Rochester.
John C. Heughes	Rochester.
N. L. Lockhart Co	Rochester.
Rochester Moulding Works	Rochester.
John Searvogel	Rochester.
P. B. & H. Moulding Co	Syracuse.

Furniture.

Annesley & Co	Albany.
Geo. Brown	Akron.
Tisdale Lumber Co	Astoria.
Auburn State Prison	Auburn.
Wade & Uphill	Batavia.
Jones Bros. & Parker	Bath.
Raymond Mfg. Co	Bath.
Binghamton Lounge Co	Binghamton.
Stickley Brandt Chair Co	Binghamton.
Wilkinson Mfg. Co	Binghamton.
Black River Bending Co	Black River.

Ellis & Smith	Bleecker.
J. M. Peter's Sons	Bleecker.
Barber & Robinson	Bolton Landing.
M. H. Humphrey	Breesport.
Brocton Furniture Co	Brocton.
American Parlor Frame Co	Brooklyn.
Gluck Bros	Brooklyn.
Gottl-Weber & Co	Brooklyn.
Edw. B. Jordan & Co	Brooklyn.
Manhattan Mantel Co	Brooklyn.
C. H. Medicus & Son	Brooklyn.
National Parlor Suit Co	Brooklyn.
M. Neufeld & Sons Inc	Brooklyn.
Raymond Table Co	Brooklyn.
Romer Mfg. Co	Brooklyn.
F. Schneider & Sons	Brooklyn.
Standard Wood Turning Co	Brooklyn.
J. Stein & Son	Brooklyn.
Thompson & Co	Brooklyn.
W. W. Vredenburgh	Brooklyn.
Bison City Table Co	Buffalo.
Blecher & Kratz	Buffalo.
Buffalo Lounge Co	Buffalo.
Colie & Son	Buffalo.
Cutler Desk Co	Buffalo.
Cutting Furniture Co	Buffalo.
Jacob Jaeckle Furniture Co	Buffalo.
Stuhlmiller Mantel Works	Buffalo.
L. Noeller's Sons	Buffalo.
Steul & Phuman Co	Buffalo.
Charles Rohlfs	Buffalo.
W. F. Babcock	Camden.
F. W. Becker	Camden.
F. S. Harden Co	Camden.
Louis Penin	Camden.
Canastota Couch Co	Canastota.
Ellis, Joyce & Hildreth	Canastota.
Steuben Library & Furniture Co	Canisteo.
Wm. O. Schwarwaelder	Chichester.
W. A. Briggs	Claryville.
The W. Hoffer Furniture Co	Cohoes.
M. B. Hawley	Colton.
University Wood Working Co	Colton.
Mullin, Wagner & Co	Coney Island.
Knaus Mfg. Co	Constantia.
Cortland Cabinet Co	Cortland.
A. D. Morton	Eaton.

Bentley Bros.	Earlville.
Cornell Table Co.	Earlville.
Roycrofters	East Aurora.
Holloway Library Co.	Eldred.
Louis E. Hudson	Ellisburg.
J. Allington & Son	Elmira.
Diven Mfg. Co.	Elmira.
Elmira Table Mfg. Co.	Elmira Heights.
American Mfg. Concern	Falconer.
Supreme Furniture Mfg. Co.	Falconer.
Century Cabinet Co.	Fort Plain.
A. & C. A. Hix	Fort Plain.
W. E. Brewer	Geneva.
J. B. Smith & Co.	Geneva.
Greene Mfg Co., Ltd.	Greene.
Koons Bros.	Grooville.
Simmons & Merwin	Stanford.
Louis Carey	Hemlock.
F. E. Hale Mfg. Co.	Herkimer.
Horrocks Desk Co.	Herkimer.
National Desk Co.	Herkimer.
Majestic Furniture Co.	Herkimer.
Standard Furniture Co.	Herkimer.
Wagner Couch Co.	Herkimer.
R. J. Fairbanks & Sons	Hermon.
Homer Table Works	Homer.
Louis Winstian	Hudson.
J. M. Deutsch Co.	Hornell.
F. L. Casper & Sons	Howes Cave.
Cornell University	Ithaca.
Alliance Furniture Co.	Jamestown.
Anchor Furniture Co.	Jamestown.
Atlas Furniture Co.	Jamestown.
Bailey Table Co.	Jamestown.
The F. M. Curtis Co.	Jamestown.
Diamond Furniture Co.	Jamestown.
Eagle Furniture Co.	Jamestown.
Eckman Furniture Co.	Jamestown.
Elite Furniture Co.	Jamestown.
Elk Furniture Co.	Jamestown.
Empire Case Goods Co.	Jamestown.
Globe Cabinet Co.	Jamestown.
Ed. L. Gossett	Jamestown.
Hemick Mfg. Co.	Jamestown.
Himebaugh Bros.	Jamestown.
Ideal Furniture Co.	Jamestown.
Jamestown Cabinet Co.	Jamestown.

Jamestown Lounge Co	Jamestown.
Jamestown Table Co	Jamestown.
Level Furniture Co	Jamestown.
Maddox Table Co	Jamestown.
Marvel Furniture Co	Jamestown.
National Furniture Co	Jamestown.
Nelson & Co	Jamestown.
A. C. Norquist Co	Jamestown.
Peerless Furniture Co	Jamestown.
The H. P. Robertson Co	Jamestown.
Seabury Mfg. Co	Jamestown.
Shearman Bros. Co	Jamestown.
Standard Table Co	Jamestown.
Star Furniture Co	Jamestown.
Superior Furniture Co	Jamestown.
Union Furniture	Jamestown.
R. Prescott & Son	Keesville.
Traphagen & Hull Mfg. Co	Kingston.
Jas. R. Richardson & Son	Lawrence.
Lestershire Furniture Co	Lestershire.
The C. J. Lundstrom Mfg. Co	Little Falls.
Koons & Co	Livingston Manor.
S. P. McCoy	Lockport.
Gould Lumber Co	Long Eddy.
DeLong Wood Working Co	Long Island City.
Klein Bros	Long Island City.
La Gana & Co	Long Island City.
J. E. Haberer Furniture Co	Lowville.
Frank S. Harden Co	McConnellsville.
Chautauqua Cabinet Co	Mayville.
J. W. Jackson & Co	Medina.
S. A. Cook & Co	Medina.
Empire Couch Co	Medina.
Maher Bros. Co	Medina.
Monitor Clock Works	Medina.
Majestic Furniture Co	Mexico.
Wm. Almy	Middleburg.
Creek Lumber Co	Middleburg.
E. A. Robinson	Mt. Vernon.
S. N. Keener Co	Newark.
Rimone Mfg. Co	New York.
John A. Banks & Bro	New York.
August Casiraghi	New York.
H. J. & J. Cohen	New York.
Diechman & Co	New York.
Jacob Dieter & Sons Co	New York.
Henry Fuldner & Sons	New York.

Glassberg & Cantner	New York.
Max Greenspan	New York.
John Helmsky	New York.
H. Herrmann Furniture Co	New York.
Hofstatter's Sons, Inc	New York.
Laum & Sons	New York.
Library Bureau	New York.
Nicholas Liesenheim	New York.
B. Lion Furniture Co	New York.
L. Marcotte & Co	New York.
John Mills & Son	New York.
William F. Meltz	New York.
Palmer & Embury Mfg. Co	New York.
T. G. Patterson Lumber Co	New York.
Perry & Son	New York.
Potter & Stymus Co	New York.
Henry Raabe & Sons	New York.
M. Reischmann & Son, Inc	New York.
Richter Furniture Co	New York.
Reddis Lumber & Veneer Co	New York.
Roebuck Weather Strip & Wire Screen Co	New York.
L. H. Russell	New York.
Theodor Saner Co	New York.
F. Schaettler	New York.
Schilling Bros. Table Co	New York.
E. Schloss & Co	New York.
Philip Strobel & Sons	New York.
G. Wagman	New York.
F. Vogel & Co	New York.
John Walsh	New York.
Ludwig Zodikow	New York.
S. W. Johnson & Son	Nichols.
Dock & Mill Co	North Tonawanda.
Huchin's-Kilbourn Co	North Tonawanda.
Geo. Wheeler	Norwich.
Ferrara Furniture Co	Oneida.
Romine Bros	Oswego.
Groat Furniture Co	Philadelphia.
Wm. C. VanClief	Port Richmond.
Batchelder & Sons	Potsdam.
Grant St. Pl. Mill Co	Potsdam.
Salmon River Table Co	Pulaski.
Curtis Spring Bed Co	Richland.
Albin Geyer	Rochester.
Blum & Michelson	Rochester.
Bohm Cabinet Co	Rochester.
Brooks Furniture Mfg. Co	Rochester.

The Hayden Co.	Rochester.
Hopeman Bros. Lbr. & Mfg. Co.	Rochester.
Geo. J. Michelson Furniture Co.	Rochester.
Miller Cabinet Co.	Rochester.
Perrin Co.	Rochester.
J. H. Reinhard & Sons	Rochester.
Vetter Desk Works	Rochester.
Yawman & Erbe Mfg. Co.	Rochester.
Everett Young	Rockwood.
J. A. Lockee	Rosie.
J. F. Dominick	Salamanca.
Fancher Furniture Co.	Salamanca.
Salamanca Furniture Works	Salamanca.
Sterling Furniture Co.	Salamanca.
Frank Collins, Jr.	Saranac.
Vosburgh Bros.	Shady.
Morse Lumber Co.	Sheds.
Sidney Novelty Co.	Sidney.
Peter Koford	Silver Creek.
F. K. Hallett	Smithville.
J. C. McMillan	So. Otselic.
Barnaby Furniture Co., Inc.	Stapleton.
Butler Mfg. Co.	Syracuse.
The Cy Brown Furniture Co.	Syracuse.
Doxtader & Wilcoxen	Syracuse.
John W. Juhl	Syracuse.
Quaint Art Furniture Co.	Syracuse.
Gustav Stickley Co.	Syracuse.
Cluett, Peabody & Co.	Troy.
Henry Schneider & Co.	Troy.
Bryant Furniture Co.	Truxton.
E. B. Clarke	Unadilla Forks.
The N. A. Tyler Lumber Co.	Vernon.
C. A. Swan	Wadhams.
James T. Young	Watervliet.
Hall & Lyon Furniture Co.	Waverly.
Plail Bros.	Wayland.
Coats Mfg. Co.	Wellsville.
Wellsville Upholstering Co.	Wellsville.
Geo. N. Gibson & Son	West Stockholm.
The Quigley Furniture Co.	Whitesboro.
W. S. Allan Mfg. Co.	Whitney Point.
Arnett O. Laurence	Yonkers.

Gates and Fencing.

Kraemer Bros. Co.	College Point.
Webster C. Woodworth	Gasport.

Beardslee Lumber Co.	Port Jervis.
Buffalo, Rochester & Pittsburg Ry. Co.	Rochester.
Conklin & Tubby Conklin	Roslyn.
Ansel Raynor	Seaford.

Handles.

Stephen Kampf	Albany.
Cady Mfg. Co.	Auburn.
John J. Potter	Binghamton.
Ellis & Smith	Bleecker.
J. M. Peter's Sons	Bleecker.
Morse Dry Dock & Repair Co.	Brooklyn.
Jackson & Tinelle	Buffalo.
O. H. Braman	Carthage.
Cadosia Mfg. Co.	Cadosia.
Rhodes Chair Co.	Cold Brook.
Dwight Divine & Sons	Ellenville.
John F. Clark	Florence.
Continental Tool Co.	Frankfort.
Union Fork & Hoe Co.	Frankfort.
J. D. Mulrenan	Hadley.
E. B. Trank	Holland.
S. F. Branning	Inglehart.
Lindblad Bros. Co.	Jamestown.
David Seancott	Lee Center.
Evans & Liddle	Lockport.
Herbert R. Greenman	McGraw.
C. F. McIntyre	Maine.
R. B. Baker	Merrifield.
D. B. Crist	Middleville.
New York Mallet & Handle Works	New York.
Buffalo Sled Co.	North Tonawanda.
Hutchins-Kilbourn Co.	North Tonawanda
W. J. & F. J. Fos	Oramel.
F. J. Carpenter	Oxbow.
Parish Fibre & Broom Co.	Parish.
Parker & Barnes	Parkers.
J. W. Elvey	Phœnicia.
The Jennings & Griffin Mfg. Co.	Port Jervis.
Edgar W. Comino	Redfield.
Elmer A. Durst	Redfield.
Everett Young	Rockwood.
D. J. Blasier	Rome.
Rumsey & Co., Ltd.	Seneca Falls.
C. E. Cobb	Sherman.
Richmond Broom Co.	Stapleton.
Lee L. Hall	Stony Creek.

Dodge & Zuill	Syracuse.
Scott E. Phinney	Wadhams.
American Novelty Co	Wellsville.

Instruments, Musical.

Boardman & Gray	Albany.
Wegman Piano Co	Auburn.
Clifton Library Co	Benson Mines.
Ellis & Smith	Bleecker.
Brockport Piano Mfg. Co	Brockport.
B. F. Gleason Mfg Co	Brockport.
Fred Gretsch Mfg. Co	Brooklyn.
Freeborn G. Smith	Brooklyn.
Tallman Organ Co	Brooklyn.
F. W. Young & Co	Brooklyn.
The Chase & Baker Co	Buffalo.
C. Kurtman & Co	Buffalo.
Viner & Son	Buffalo.
Wood & Brooks Co	Buffalo.
A. C. Cheney Piano Action Co	Castleton.
Rhodes Chair Co	Cold Brook.
Julius Breckwald & Co	Dolgeville.
Fort Plain Electric Piano Co	Fort Plain.
The Autophone Co	Ithaca.
Ahlstrom Piano Co	Jamestown.
C. W. Herrick Mfg. Co	Jamestown.
Eifert & Stoehr	Long Island City.
Reuben Midmer & Son	Merrick.
E. Anderburg	Mt. ernon.
Grubb & Kosegarten Bros	Nassau.
American Piano Co	New York.
Autotone Company	New York.
Behning Piano Co	New York.
C. E. Bryne Piano Co	New York.
Biddle Piano Co	New York.
Christman Piano Co	New York.
Jos. N. Courtâde	New York.
Jacob Doll & Sons	New York.
Duchman & Co	New York.
Dusinberre & Co	New York.
Eastey Piano Co	New York.
Hardman, Peck & Co	New York.
Hazelton Bros	New York.
Kaffenberger & Cantor	New York.
Kindler & Collins	New York.
Kohler & Campbell	New York.
Kranich & Bach	New York.

Kroeger Piano Co	New York.
The Laffargue Co	New York.
Lockhart & Co	New York.
Ludwig & Co	New York.
Paul G. Mehlin & Sons	New York.
J. H. & C. S. Odell & Co	New York.
Ricca & Son, Inc	New York.
George Schleicher	New York.
The Schubert Piano Co	New York.
The Staib Abendschein Co	New York.
Standard Pneumatic Action Co	New York.
Steinway & Sons	New York.
Sohmer & Company	New York.
Strauch Bros	New York.
Stultz & Bauer	New York.
Votey Organ Co	New York.
Wasle & Company	New York.
Walters Piano Co	New York.
Weber Piano Co	New York.
Weser Bros	New York.
Wessell, Nichol & Groos	New York.
Niagara Musical Instrument Co	North Tonawanda.
North Tonawanda Musical Instrument Works	North Tonawanda.
Rudolph Wurlitzer Mfg. Co	North Tonawanda.
Robt. G. Potter	Orwell.
American Piano Co	Rochester.
Gibbons & Stone	Rochester.
The Phelps & Lyddon Co	Rochester.
M. S. Phelps Mfg. Co	Rochester.
Ropelt & Son's Piano Co	Rochester.
Edward Kingsley	Salisbury Center.
Frederick Englehardt & Sons	St. Johnsville.
The Amphion Co	Syracuse.
Thos. H. Knollin	Syracuse.
A. D. Beach	Troy.
C. E. Morey	Utica.
Herbert A. Burlingame	Walton.
Vough Piano Co	Washington.
John J. Smith	White Plains.

Instruments, Professional.

Bliss Mfg. Co	Bliss.
J. S. Charles	Bliss.
Eberhard Faber Pencil Co	Brooklyn.
R. H. Hoyt	Buffalo.
B. C. Beach	Elton.
American Mfg. Concern	Falconer.

White Mop Wringer Co.	Fultonville.
Stanford-Crowell Co.	Ithaca.
Ansco Co. Camera Works.	Lestershire.
Eagle Pencil Co.	New York City.
F. & O. Cedar Works, Ltd.	New York City.
James S. Lord.	Penfield.
American Drafting Furniture Co.	Rochester.
Wm. G. Bell.	Rochester.
Geo. P. Bortle Co.	Rochester.
Eastman Kodak Co.	Rochester.
National Advertising Co.	Seneca Falls.
Wescott-Jewell Co.	Seneca Falls.
Brown & Kearney Co.	Silver Springs.
Henry Salzler.	Springville.
Lee L. Hall.	Stony Creek.
Tonawanda Advertising Co.	Tonawanda.

Laundry Appliances.

B. S. Jenkins.	Ballston Springs.
The Seger-Prindle Mfg. Co.	Belvidere.
Howland Bros.	Berkshire.
The Gilroy Stretcher Co.	Buffalo.
R. H. Hoyt.	Buffalo.
J. D. Russ & Co.	Buffalo.
W. W. Allen.	Dobbs Ferry.
Frank Ellicott.	Eagle Harbor.
The Wiard Mfg. Co.	East Avon.
The Blackstone Mfg. Co.	Jamestown.
Lestershire Lbr. & Box Co.	Lestershire.
A. H. Crawford.	Liverpool.
Thaler Bros.	Lyons Falls.
Estate Sherman Tenant.	Northville.
H. & L. Tenant.	Northville.
Geo. A. Campbell.	Portageville.
American Laundry Machine Co.	Rochester.
Geo. P. Bortle Co.	Rochester.
Sidney Novelty Co.	Sidney.
Cluett, Peabody & Co.	Troy.

Machine Construction.

C. O. Tinkham.	Akron.
E. F. Smith.	Allegany.
Wm. Dobson.	Canastota.
Wickewire Bros.	Cortland.
Geo. Juengst & Son.	Croton Falls.
Alphonso Walrath Co.	Fort Plain.

Dilts Machine Works	Fulton.
Monarch Road Roller Co	Groton.
Noble & Wood Machine Co	Hoosick Falls.
Remington Typewriter Co	Ilion.
Williams Bros	Ithaca.
Lindblad Bros. Co	Jamestown.
Universal Road Machinery Co	Kingston.
W. D. Davis	Lockport.
Merritt Mfg. Co	Lockport.
Joseph Whalen	Lockport.
William C. Aul	Lyons.
S. Chency & Sons	Manlius.
Climax Road Machine Co	Marathon.
Green Fuel Economizer Co	Matteawan.
Shepard Electric Crane & Hoist Co	Montour Falls.
S. N. Keener Co	Newark.
Foote Mfg. Co	Nunda.
De La Vergne Machine Co	New York City.
Oil Wells Supply Co	Oswego.
American Wood Washing Machine Co	Rochester.
Hopeman Bros. Lbr. & Mfg. Co	Rochester.
Huntley Mfg. Co	Silver Creek.
Invincible Grain Cleaner Co	Silver Creek.
The S. Howes Co	Silver Creek.
Boomer & Boschert Press Co	Syracuse.
The Engelberg Huller Co	Syracuse.
Moore Trench Machine Co	Syracuse.

Machinery and Apparatus, Electrical.

La Rose Mfg. Co	Albany.
The Avoca Mfg. Co	Avoca.
Buffalo Telephone Construction Co	Buffalo.
Wilheton & Koehler Electrotype Co	Buffalo.
Goble Bros	Dundee.
Acme Road Machine Co	Frankfort.
The National Conduit & Cable Co	Hastings on Hudson.
Cadwell Cabinet Co	Jamestown.
Hall Iron Works	Lockport.
Bubeck & Guerin	New York City
Electric Fireproofing Co	Tompkins Sq. Sta.
F. J. Newcomb Mfg. Co	New York City.
S. W. Johnson & Son	Nichols.
J. P. Manufacturing Co	Niverville.
James S. Lord	Penfield.
General Railway Signal Co	Rochester.
Stromberg Carlson Tel. Mfg. Co	Rochester.
Gould Storage Battery Co	Syracuse.

Patterns and Flasks.

Westinghouse Machine Co.	Attica.
P. E. Kennehan	Brasher Falls.
Chas. Rohlfs	Buffalo.
W. P. Taylor Co.	Buffalo.
Geo. Juengst & Son	Croton Falls.
Dwight Divine & Sons	Ellenvilie.
Acme Road Machinery Co.	Frankfort.
Ditts Machine Works	Fulton.
Gowanda Agricultural Works	Gowanda.
The Star Iron Works	Gowanda.
Lyons Iron Works	Greene.
Monarch Road Roller Co.	Groton.
Noble & Wood Machine Co.	Hoosick Falls.
Remington Typewriter Co.	Ilion.
Lindblad Bros. Co.	Jamestown.
Universal Road Machinery Co.	Kingston.
Leroy Plow Co.	Leroy.
American Laundry Machinery Co.	Lincoln Park.
Gardner Foundry Co.	Lockport.
Hall Iron Works	Lockport.
Lockport City Pattern Works	Lockport.
McKim Foundry & Machine Co.	Lockport.
Merrett Mfg. Co.	Lockport.
General Vehicle Co.	Long Island City.
S. Chency & Son	Manlius.
E. U. Scoville Co.	Manlius.
N. Y. O. & West R. R. Co.	Middletown.
Milliken Bros.	Milliken.
Shepard Electrical Crane & Hoist Co.	Montour Falls.
Robert J. and T. H. Stewart	New Hamburg.
George Fox & Sons	New York.
DeLaVergne Machine Co.	New York.
E. D. Shaver	Niverville.
E. R. Allen Foundry Co.	Painted Post.
Peekskill Hat Mfg. Co.	Peekskill.
Lozier Motor Co.	Plattsburg.
American Laundry Machinery Co.	Rochester.
American Woodworking Machy. Co.	Rochester.
Co-operative Foundry Co.	Rochester.
Joseph Fahy & Co.	Sag Harbor.
American Locomotive Co.	Schenectady.
General Electric Co.	Schenectady.
Westinghouse Co.	Schenectady.
The Gould Mfg. Co.	Seneca Falls.
Rumsey & Co., Ltd.	Seneca Falls.
D. W. Seely	Sodus Point.

The Engelburg Huller Co	Syracuse.
Gould Storage Battery Co	Syracuse.
E. C. Stearns & Co	Syracuse.
Maxwell Briscoe Motor Co	Tarrytown.
Cluett Peabody & Co	Troy.
James B. Crowell & Son	Wallkill.
Geo. B. Mentz Co	Wallkill.
Warsaw Wilkinson Co	Warsaw.
Otis Elevator Company	Yonkers.

Planing Mill Products.

O D. Greene	Adams.
Fred L. Webster	Adams.
W. E. Griffiths	Addison.
Smith Bros	Addison.
Blakeslee Lbr. Co	Albany.
Cameron & Hawn	Albany.
Hart & Fleet	Albany.
Laib Bros	Albany.
Ramsdill & Co	Albany.
Wm. Taafe's Sons	Albany.
C. M. Mallory	Albion.
F. C. Campbell	Alpine.
Fred E. Purly	Altona.
M. B. Horsley	Alvord.
L. Belger	Akron.
Wood Lbr. Co	Amityville.
J. D. Lasher	Amsterdam.
Wm. Servoss & Son	Amsterdam.
Elmer E. Travis	Angelica.
Geo. D. Bethel	Antwerp.
Frank Palmer & Son	Apalachin.
A. H. Pierson	Apex.
The Arcade Planing Mill Co	Arcade.
G. Fardink & Son	Ashville.
Green Bros	Ashville.
Tisdale Lbr. Co	Astoria.
P. H. Hendricks	Atwood.
A. A. Vandermark & Son	Atwood.
Wesley Ranger	Attica.
Clark Lbr. Co	Auburn.
E. B. & H. J. Koon	Auburn.
Luke Williams	Auburn.
L. C. Lum	Barker.
W. R. Prouty	Bainbridge.
E. A. Curtis	Ballston.
C. B. Rebb	Barnes Corner.

Holloway Lumber Co.	Barryville
Wade & Uphill	Batavia.
Jones Bros. & Parker	Bath.
John R. Ness & Son	Beaver Brook.
A. B. Weir	Belfast.
Howland Bros	Berkshire.
Ellis & Smith	Bleecker.
Clarke & Parsons	Bloomingdale.
Big Indian Wood Products Co., Ltd	Big Indian.
Bartlett & Co	Binghamton.
F. B. & J. W. Lacey	Binghamton.
E. D. & Wm. Van Antwerp	Binghamton.
Parker & Root	Bolivar.
Bolton Landing Lbr. Co	Bolton Landing.
H. R. Loveland	Boonville.
Lewis Wurtz	Boston.
F. M. Hoy	Brainerdsville.
Broadalbin Lumber Co	Broadalbin.
Brocton Hardware & Lumber Co	Brocton.
W. A. Robinson	Brisbane.
Cropsey & Mitchell	Brooklyn.
Cross, Austin & Ireland Lumber Co	Brooklyn.
Eagle Moulding Co	230 Java st., B'klyn.
Eastern District Trim & Lumber Co	Brooklyn.
Eclipse Box & Lumber Co	425 Greenpoint ave., Brooklyn.
Benj. G. Hitchings	East 34th and Avenue M, Brooklyn.
Johnson Bros.	45 Classon avenue, Brooklyn.
John S. Loomis Co	Brooklyn.
A. Merkinson	554 Hamilton ave., Brooklyn.
Mullin, Wagner & Co	2828-30 West 16th st., Coney Island.
Chas. Rothenback	Brooklyn.
Second Ave., Planing Mill & Box Factory	Brooklyn.
J. Schindele's Son	Brooklyn.
Edward C. Smith	420 Oakland street, Brooklyn.
Hardy Vorhees & Co	Brooklyn.
Samuel Weinstein Estate	Brooklyn.
M. L. Wolford & Son	Breakabeen.
D. M. White	Brookton.
Chas. Codman	Brownville.
Batavia & New York Woodworking Co	Buffalo.
Buffalo Planing Mill Co	Buffalo.

Christian Flierl	Buffalo.
Dohn, Fischer & Beyer	Buffalo.
East Buffalo Mill & Lumber Co	Buffalo.
G. Elias & Bros	Buffalo.
John Feist & Sons Co	Buffalo.
John E. Grenzebach	Buffalo.
E. M. Hager & Sons Co	Buffalo.
Wm. Henrich's Sons Co	Buffalo.
Hurd Bros.	Buffalo.
Lindsay Floor Co	Buffalo.
Montgomery Bros. Co	Buffalo.
William Neubecker	Buffalo.
George A. Norton, Jr	Buffalo.
George F. Sowerby	Buffalo.
M. Zeis & Sons	Buffalo.
Irwin Dunham	Burdett.
S. L. Kelsey	Burlington.
Martin Herman	Callicoon.
Frank R. Beecher	Canandaigua.
Geo. T. Thompson	Canandaigua.
Chas. L. Wheeler	Canaseraga.
Geo. W. Dana	Camden.
Booth Bros.	Candor.
Ellis & Moore	Candor.
Alfred Slawson	Canisteo.
E. W. Gillett	Cannonsville.
Bucks Bridge Lumber Co	Canton.
Judd W. Rushton	Canton.
W. F. Babcock	Camden.
J. A. Scobell	Cape Vincent.
Brown Bros.	Carlisle.
Adirondack Core & Plug Co	Carthage.
L. Knott & Co	Cassadaga.
The Elitsac Mfg. Co	Castile.
Catskill Supply Co.	Catskill.
William Bihl	Central Islip.
D. W. Smith	Central Square.
A. Matthews	Charlotte.
C. L. Sancomb	Chateaugay.
T. S. Buckley & Son	Chatham.
C. E. Hess	Cherry Creek.
Lemuel Maxim	Chestertown.
J. F. Thurston	Chestertown.
Jas. H. Moore	Cincinnatus.
W. A. Briggs	Claryville.
Dygert Bros.	Clayton.
T. E. Davis	Clayville.

A. L. Dows	Clifton Park.
Clymer Door, Sash & Lumber Co	Clymer.
H. D. Karker & Co	Cobleskill.
Cohoes Union Bobbin Works	Cohoes.
G. H. Crandall & Co	Cohoes.
Miller Bros.	Colden.
Kraemer Bros. Co	College Point.
Johengen Johnson & Schmitz	Collins Center.
Stanley J. House	Colosse.
Jacob Henderson	Columbiaville.
White & Vogel	Comstock.
Rhodes & Johnson	Conklingville.
The Steam Mill Co	Constableville.
H. E. Lewis & Co	Cooperstown.
John B. Austin	Copenhagen.
James Carey	Copenhagen.
The Corning Building Co	Corning.
H. R. Taylor	Cornwall.
Harry Smith	Cornwallville.
H. F. Benton Lumber Co	Cortland.
Bush & Glover	Cortland.
John Frank	Coxsackie.
J. F. Farney	Croghan.
J. R. Lafavre Lumber Co	Croghan.
E. S. Virkler	Croghan.
William J. McKittrick	Crown Point.
J. W. Phillips	Crown Point.
J. E. Pond & Son	Crown Point.
J. W. Hutchins	Cuba.
Phelps & Sibley Co	Cuba.
Fontaine & Miller	Dansville.
W. F. Smith	Dansville.
J. H. Waterman	Deansboro.
William M. Wilson	Deerland.
C. Van Ornum	Degrasse.
Lemuel Clark	DeKalb Junction.
Hunt & Washburn	Delanson.
Goo & Hopkins	Delevan.
Deposit Lumber Co	Deposit.
Dexter Woodworking & Builders Supply Co	Dexter.
B. L. Orcutt & Sons	Dickinson Center.
H. B. Livermore	Dresserville.
H. H. Hunter	Dryden.
Goble Bros.	Dundee.
Madigan Lumber Co	Dunkirk.
O'Donnell Lumber Co	Dunkirk.
J. H. Taylor	Dunkirk.

Frank Ellicott	Eagle Harbor.
W. H. Geib	East Aurora.
S. H. Peck	East Aurora.
Thos. L. Hayes	East Chatham.
H. E. Utter	East Durham.
Henry W. Mastin	East Galway.
L. V. Sikes	East Otto.
Hanford Bros.	East Meredith.
A. A. Stewart	East Randolph.
Eden Planing Mill Co	Eden Center.
E. L. Ackerman	Edmeston.
Horace Beach & Son	Edwards.
Woodcock Bros.	Edwards.
Holloway Lumber Co	Eldred.
J. T. Greig	Eldred.
H. & J. G. Love	Eldred.
Willard Wells & Son	Eldred.
George W. Dibbell	Elka Park.
J. L. Carter	Ellenburg.
E. E. Hobbs & Son	Ellenburg Center.
Wm. H. Deyo	Ellenville.
Frank Dixon	Ellenville.
Rust & Olin	Ellicottville.
Chas. J. Main	Ellington.
Mason H. Terry	Ellington.
Almon O. Clark	Elizabethtown.
Lobdell Bros.	Elizabethtown.
Doane & Jones Lumber Co	Elmira.
Harris, McHenry & Baker Co	Elmira.
Chas. Newton	Elmira.
Verne Wells	Elmira.
J. N. Wood & Co	Elmira.
Young Lumber Co	Elmira.
John R. Jump	Elmira.
B. C. Beach	Elton.
C. C. Stafford	Essex.
Jamestown Mantel Co	Falconer.
Thos. Pepper	Far Rockaway.
Geo. Kaiser Lumber Co	Far Rockaway.
William Schoncke	Far Rockaway.
Edward Common	Fillmore.
L. F. Swartz	Findley Lake.
Fred A. Stevens	Fine.
K. Brownell	Fishers.
Harry Morrison	Forestine.
F. L. Crandall	Fort Ann.
James Courtray	Fort Covington.

P. Keefe	Fort Covington.
E. O. Forbes	Fort Covington.
A. E. Ober	Fort Jackson.
Fort Plain Mfg. Co	Fort Plain.
W. L. Hart	Franklin Springs.
Sly & Coddington	Fredonia.
T. R. Bryant	Freeville.
C. Thurston & Son	Friendship.
Geo. Deis Son & Co	Fulton Chain.
Elaine W. Haverley	Gallupvilie.
W. Ray Card	Garcattsviile.
Webster C. Woodworth	Gasport.
R. J. Rogers Lumber Co	Geneva.
N. V. Reynolds	Georgetown.
L. C. Felpel	Ghent.
D. H. Weaver	Glenco Mills.
Glenfield Mfg. Co	Glenfield.
W. Johnson	Glenfield.
Gifford Lumber Co	Glens Falls.
Kendrick & Brown	Glens Falls.
Kendrick & Brown Co	Glens Falls.
Finch, Pruyn & Co., Inc	Glens Falls.
Holden Lumber Co	Gloversville.
Russell E. Holmes	Gloversville.
Dean Lumber Co	Gowanda.
Frank Richter	Grafton.
Geo. B. Reynolds	Grahamsville.
W. Cronk	Grand Gorge.
Fred Potter	Granville.
J. E. Gould	Greene.
Lyons Iron Works	Greene.
L. M. Smith	Greenville.
G. M. Woodward	Greenwood.
Crosby Kelly	Griffin Corners.
J. S. Tripp	Guilford.
N. E. Yaw	Hague.
J. H. Carpenter	Hailesboro.
Hamburgh Planing Mill Co	Hamburg.
William Soper	Hammond.
Walter B. Morley	Hancock.
T. F. Stimpson	Hancock.
Reuben A. Kilbourn Esq	Harrisville.
John Moore	Harrisville.
Wm. P. Hartman & Sons	Hartman.
C. F. Naylor	Hartwick.
E. C. Smith	Henderson.
Hitchcock & Haney	Hensonville.

C. R. Snell & Sons Co.	Herkimer.
West Canada Lumber Co.	Herkimer.
Murray A. Babcock.	Hermon.
Yagel Bros.	Highland Falls.
Robert Westover	Hillsdale.
Van Buren & Conkling.	Hobart.
F. A. Jones.	Holcomb.
Holland Planing Mill Co.	Holland.
U. L. Ceole.	Holley.
John Murphy	Holley.
Chas. S. Brown.	Homer.
S. M. Brownell.	Hope Falls.
Thomas Bolton, Jr.	Horicon.
McConnell Mfg. Co.	Hornell.
W. E. Tuttle Lumber Co.	Horseheads.
Griffin Lumber Co.	Hudson Falls.
Kenyon Lumber Co.	Hudson Falls.
Brown Bros.	Hyndsville.
Conrad Klipple	Ilion.
George Kaiser	Inwood.
F. T. Brock	Ithaca.
Cornell University Repairs Department.	Ithaca.
Fred Middaugh	Ithaca.
Robinson & Carpenter.	Ithaca.
Alexander Peircey	Jamacia.
James H. Stansbury.	Jamaica.
Caflish Bros.	Jamestown.
Charles Lindbeck	Jamestown.
Nelson Bros.	Jamestown.
Pearl City Veneer Co.	Jamestown.
Estate of John T. Wilson.	Jamestown.
Walrath Bros. & Wentworth.	Jasper.
Nye Bros.	Jay.
William Kohler	Jeffersonville.
Charles C. Kantz.	Johnsonville.
D. B. Stevens.	Johnsonville.
L. Stephenson	Johnstown.
Younglove Lumber Co.	Johnstown.
W. J. Daniels.	Katonah.
F. S. Beede	Keene Valley.
Nichols Bros.	Kennedy.
M. E. Green	Kerhonkson.
Jas. S. Van Etten.	Kerhonkson.
Killawog Red Mills.	Killawog.
Kingston Woodworking Co.	Kingston.
Theodore Weeks	Kingston.
W. H. Thompson.	Kokomo.

Albert Scribner	Knowelhurst.
West Seneca Lumber Co	Lackawanna City.
W. A. Barlow	Lacona.
The Blount Lumber Co	Lacona.
C. N. Morse	Lackawack.
G. R. Russell	Lake George.
W. S. Worden	Lake George.
Smith & Murray	Lake Placid.
Lake Placid Co	Lake Placid.
Asa Bird	Lake Pleasant.
Geo. W. Safford	Lancaster.
G. W. Ainslie	Laurens.
J. H. Smith	Lawrence.
David Swancott	Lee Center.
J. Lapp	LeRoy.
T. C. Rogers	LeRoy.
Lestershire Lumber & Box Co	Lestershire.
E. A. Sargents	Lewis.
F. S. Grant	Liberty.
Robert Kinne	Liberty.
Andrew Little & Son	Little Falls.
A. M. Chandler	Long Eddy.
Doncaster Planing Mill Co	Long Island City.
Gould Lumber Co	Long Eddy.
Henry Peak	Long Eddy.
E. A. Lamor	Long Lake.
W. C. Robinson & Bro	Long Lake.
Thos. W. Rogers	Long Lake.
A. W. Shaw	Long Lake.
A. L. Gillett	Lorraine.
J. A. Denney	Lorraine.
Glen M. Parker	Lowville.
Fred Dingman	Luzerne.
Stone Bros.	Luzerne.
J. C. Gray & Co	Lyndonville.
George W. Buisch & Son	Lyons.
William Fleming	McDonough.
H. S. Fuller	McLean.
David Crump	Madrid.
Perkins Lockwood	Madrid.
J. E. Thompson	Madrid.
Geo. A. Courbat	Mallory.
C. H. Dupee	Malone.
John Kelley	Malone.
The Malone Lumber Co	Malone.
Margaretville Planing Mill	Margaretville.
Burnside Bros.	Maryland.

Wm. Barber	Mechanicsville.
T. C. Luther	Mechanicsville.
A. D. Strang	Mechanicsville.
Mrs. J. K. Arnes	Mexico.
J. J. Vault	Mexico.
Wm. Almy	Middleburg.
Creek Lumber Co	Middleburg.
S. C. West	Middleburg.
Wilfred Colburn	Middle Grove.
Witherbee Sherman & Co	Mineville.
D. C. Blair	Montour Falls.
Ralph L. Teeter	Moravia.
C. B. Rhodes	Moreland Sta.
William S. Lawrance	Moira.
H. D. Barton	Moriah Center.
F. M. Purdy	Morrisonville.
Gillis Bros.	Morristown.
Mt. Kisco Woodworking Co	Mt. Kisco.
H. L. Crain	Mount Upton.
Burton & Fentor	Mt. Vernon.
Kapp & Nordholm	Mt. Vernon.
E. A. Robinson	Mt. Vernon.
Southern Lumber Co	Mt. Vernon.
Manning & Reddant	Naples.
Bert Budlong	Natural Bridge.
S. N. Keener Co	Newark.
M. J. Clark	Newark Valley.
W. H. Baldwin	New Baltimore.
C. D. Hallock	New Baltimore.
John Tisse	New Bremen.
Newfane Basket Mfg. Co	Newfane.
Smith & Murray	Newman.
New Rochelle Coal & Lumber Co	New Rochelle.
Ahnehan Co.	New York.
Bardsley Bros.	New York.
Beekman Sash, Door & Woodworking Co	New York.
Alex. R. Brown	New York.
John A. Delatone	New York.
Dunbar Box & Lumber Co	New York.
East River Mill & Lumber Co	New York.
East Side Planing Mill	New York.
F. Eckenroth	New York.
Jacob Froehlich Cabinet Works	New York.
Hanson-Turner Co.	New York.
Hasbrouck Flooring Co	New York.
Haynes & Coryell	New York.
Kalt Lumber Co	New York.

James McBride Co.	New York.
McConnell Mfg. Co.	New York.
J. F. McLaughlin	New York.
Manhattan Woodworking Co.	New York.
F. R. Merrall & Co.	New York.
Mershon & Morley Co.	New York.
Mount & Robertson	New York.
J. F. Murphy Lumber Co.	New York.
Murray & Hill Co., Inc.	New York.
T. G. Patterson Lumber Co.	New York.
Perry & Son	New York.
C. Rieger's Sons, Inc.	New York.
Schuyler Flooring Co.	New York.
Sloane & Moller	New York.
Smith & Lenhart	New York.
Tuttle Bros.	New York.
T. D. Wadelton	New York.
West 30th St. Planing Mill	New York.
William P. Youngs & Bros.	New York.
Zubrinsky Mldg. Mfg. Co.	New York.
Ayers & Witmer Lumber Co.	Niagara Falls.
Haeberle Lumber Co.	Niagara Falls.
Wicker Lumber Co.	Niagara Falls.
J. T. Pethick	Narrowsburg.
Estate of J. H. Smith	Northampton.
Geo. L. Klinger	North Branch.
M. H. Forbes	North Brookfield.
Fred Lindow, Sr.	North Collins.
A. H. Reed	North Clymer.
C. S. Wood	North Creek.
Victor Epps	North Franklin.
Frank Hollister	North Granville.
Jas. R. Richardson & Son	North Lawrence.
Ray H. Bennett	North Tonawanda.
Geo. Berry & Co.	North Tonawanda.
The Chas. G. Doebler Planing Mill	North Tonawanda.
W. G. Palmer	North Tonawanda.
Robinson Bros. Lumber Co.	North Tonawanda.
Thompson, Hubman & Fisher	North Tonawanda.
White, Gratwick & Mitchell	North Tonawanda.
L. W. Wiedman	North Tonawanda.
Levi Countrymen	North White Lake.
Roy K. Hall	North White Lake.
Chas. Winters	North White Lake.
Estate Sherman Tenant	Northville.
John A. Willard	Northville.
E. J. Elliott	Norwich.

W. L. Scott Lumber Co.	Norwich.
George Wheeler	Norwich.
R. D. Reed	Norwood.
Adam Snyder	Oak Hill.
Jones & Johnson	Oaksville.
N. F. De Witt	Odessa.
H. Nelson Brown	Ogdensburg.
Skilling's, Whitney's & Barnes' Lumber Co.	Ogdensburg.
A. Weston Lumber Co.	Olean.
Augustus Lowry	Olmstedville.
McFee & Borst	Oneonta.
Richards & Son	Oneonta.
Young, Beach & Maker	Oneonta.
Orchard Park Planing Mill Co.	Orchard Park.
John Z. Teal	Orchard Park.
Robt. G. Potter	Onoville.
C. Colton	Oswegatchie.
A. Paine & Son	Oswego.
Post & Henderson Co.	Oswego.
J. E. Jones	Oswego.
Boyce Lumber Co.	Owls Head.
F. J. Carpenter	Oxbow.
A. B. Fairbanks	Oxbow.
W. S. Fletcher	Oxbow.
Chas. H. Church	Oxford.
Painted Post Lumber Co.	Painted Post.
Clinton C. Fusmer	Palatine Bridge.
Frank E. Miller	Parish.
Pendleton & Townsend	Patterson.
Paul Smith & Sons	Paul Smiths.
Wm. Brotherton's Sons	Peekskill.
Hopkins, Regua & Hopkins	Peekskill.
Chas. A. Lamas	Peekskill.
Pelham Saw Mill Co.	Pelham.
Bartlett Bros.	Pepacton.
A. Mason & Sons	Peru.
T. C. Ginney	Peterboro.
J. H. Loomis & Sons	Phœnix.
William Powers	Pike.
A. J. Beardsley	Pitcher.
G. W. Bennett	Pitcher.
L. H. Lusk	Pittsford.
Wadhams & Whitlock	Pittsford.
Plattsburg Lumber Co.	Plattsburg.
E. D. Conner	Poland.
Geo. Mertz & Sons	Port Chester.
Port Chester Lumber Co.	Port Chester.

Levi Bigelow	Port Henry.
Jones Bros.	Port Jefferson.
Beardslee Lumber Co	Port Jervis.
Wm. S. Van Olief	Port Richmond.
Wm. C. Van Chief	Port Richmond.
The A. Sherman Lumber Co	Potsdam.
T. E. Ringrose	Prattsburg.
Stephen Brazee	Preston Hollow.
W. M. Wilder	Pulaski.
A. J. Sample	Randolph.
H. A. Beede	Reber.
Cook & Smith	Redwood.
Wheater & Johnson	Rensselaer Falls.
Reynolds Bros. & Co	Reynoldston
The J. H. Strait Mfg. Co	Rexville.
A. C. Toof	Rhinebeck.
Fred Greene	Richford.
Lewis Gillette	Richmondville.
A. A. Gates	Richville.
Garrison & Peck	Ripley.
Benteleon Bros. Co	Rochester.
Wm. G. Bell	Rochester.
P. Enders	Rochester.
Chas. P. Evans Co	Rochester.
The Hayden Co	Rochester.
Wm. B. Morse Lumber Co	Rochester.
J. H. Reinhard & Sons	Rochester.
Rochester Box & Lumber Co	Rochester.
Rochester Trim Co	Rochester.
C. H. Rugg Co	Rochester.
Spencer Lumber Co	Rochester.
Stoertz Bros	Rochester.
Traders Box & Lumber Co	Rochester.
Williamson Mill & Lumber Co	Rochester.
Chas. Grabbe Co	Rockaway Beach.
S. N. Skinner & Son	Rockdale.
South Side Mill	Rockville Center.
Beach Lumber Co	Rome.
Isaac T. Watson	Roscoe.
Conklin, Tubby & Conklin	Roslyn.
Isaac Hicks	Roslyn.
A. M. Tarbell	Rushford.
Clark H. Burkdorf	St. Johnsville.
A. Sponable	St. Johnsville.
G. H. Cleveland	Sag Harbor.
Joseph Fahys & Co	Sag Harbor.
G F. Miller & Son	Salamanca.

Salamanca Lumber Co.	Salamanca.
Mr. Chas. Chamberlin	Salem.
J. S. Jenkins	Salem.
J. E. Davis & Son	Sauquoit.
Branch & Callanan	Saranac Lake.
McKenna & Hamlin	Saranac Lake.
Wm. J. Case & Sons	Saratoga Springs.
Chas. B. Davis	Savona.
Geo. N. Sides	Schenevus.
Peckham, Wolf & Co.	Schenectady.
Brown & Walker	Schenectady.
Schroon Lake Lumber Co.	Schroon Lake.
F. N. Tyrrell	Schroon Lake.
Schuyler Lake Lumber Co.	Schuyler Lake.
Funston Bros.	Schuylerville.
Bursley Merenes	Seward.
Morse Lumber Co.	Sheds.
Fred Briggs	Sinclairsville.
S. Littlefield	Sinclairsville.
Albert P. Hamm	Sodus.
Munn & Munn	Sodus Center.
P. T. Aussen	South Bethlehem.
Nathaniel Bagg	South New Berlin.
Clayton Swartout	South Westerlo.
Volbrecht & Wild	Spencer.
Ellwood Barringer	Springwater.
George Herbold	Springville.
Henry Salzler	Springville.
L. J. Shuttleworth	Springville.
Frank H. Stuart	Springwater.
A. T. Wheeler	Springville.
Harding Morse	Steamburg.
Alden S. Swan	Stevensville.
Gordon W. Stetson	Stockwell.
D. F. Bayles & Sons	Stony Brook.
Lee L. Hall	Stony Creek.
A. D. Scribner	Stony Creek.
J. Reisdorf	Strykersville.
D. Van Alstyne & Sons	Stuyvesant.
S. A. Adams	Summitville.
Fred Butler	Surprise.
Arthur Dense	Swartwood.
Builders Mfg. Co.	Syracuse.
E. E. Chapman & Sons, Inc.	Syracuse.
E. M. Klock & Sons, Inc.	Syracuse.
The Piquet Box & Lumber Co.	Syracuse.
John J. Sherlock	Syracuse.

David Hunter	Tahawus.
Fred Weist	Talcottville.
D. M. Dibble Sons	Tannersville.
Ira S. Conover	Tarrytown.
Alfred Blonin	Tarrytown.
William O. Sutton	Tarrytown.
N. Berry	Taylor.
Geo. Heller & Co	Theresa.
R. P. & L. R. Mead	Ticonderoga.
S. B. Moore	Ticonderoga.
W J. Smith Lumber Co	Ticonderoga.
C. J. Wilk & Co	Tonawanda.
Cluett, Peabody & Co	Troy.
United Shirt & Collar Co	Troy.
Norwood Mfg. Co	Tupper Lake.
Santa Clara Lumber Co	Tupper Lake.
A. Sherman Co	Tupper Lake.
Hugh Hughes	Turin.
Harry Stevens	Union.
B. Howard	Union Center.
Cox Bros	Union Grove.
L. Roy Jenkins	Union Grove.
Nye Bros	Upper Jay.
Upper Saranac Association	Upper Saranac.
A. V. Simmons	Urlton.
Max Richter	Ushers.
Amos, Nellis & Swift	Utica.
Chas. C. Kellogg & Sons Co	Utica.
Kimball Lumber Co	Utica.
Philip Thomas & Sons	Utica.
Wm. Vails' Sons	Vail Mills.
L. L. Briggs	Van Etten.
S. D. Tilyon	Vanhornesville.
The N. A. Tyler Lumber Co	Vernon.
Henry Burdick	Waddington.
Rutherford & Dunn	Waddington.
Scott & Phinney	Wadhams.
Coleman & Jones	Walton.
Rich Lumber Co	Wanakena.
Rice & Woodward	Warrensburg.
V. B. Horton	Warwick.
Welch Bros	Warwick.
Case Lumber & Roofing Co	Watertown.
Chas. W. Sloat & Son	Watertown.
White & Sullivan	Watertown.
Crampton & Belden Co	Watervliet.
W. H. Marsh & Co	Watervliet.

Fixture & Lumber Co	Watkins.
H. J. Baldwin & Son	Waverly.
Geo. Bliss	Wayne.
The Abram Walrath Co	Weedsport.
Harison-Turner Co	Wells.
F. L. Knowles Casket Co	Wellsville.
Oak Duke Lumber Co	Wellsville.
A. G. Houser	West Branch.
Samuel Eastham	West Ocanada.
M. S. Faulkner	West Conesville.
Harvey A. Treesdell	West Coxsackie.
Westfield Lumber & Coal Co	Westfield.
Wm. Gibson	West Galway.
Wm. Simpson	West Shokan.
Geo. N. Gibson & Son	West Stockholm.
P. Mortons Sons	Weverton.
C. C. Stafford	Whallonsburgh.
F. H. Lyman	Whippleville.
J. H. Fournier Planing Mill Co	Whitehall.
Denton & Waterbury	Whitesboro.
J. H. Wood	Whitesville.
Seymour Ruggles	Wilton.
W. E. Kelly	Windham.
G. S. Van Buskirk	Wiscoy.
F. B. Mee	Yonkers.
A. J. Servis & Son	Youngstown.

Plumbers' Woodwork.

La Rose Mfg. Co	Albany.
M. P. Berglass Mfg. Co	Brooklyn.
Coyne & Delany Co	Brooklyn.
Raebeck & Zinthum	Brooklyn.
Buffalo Bath Cabinet Co	Buffalo.
Wm. S. Emery	New York.
Ansel Raynor	Seaford.

Printing Material.

Buffalo Engraving Co	Buffalo.
Wilhelm & Koehler Electrotype Co	Buffalo.
Setter Bros. Co	Cattaraugus.
Printers' Supply Co	New York.
Sidney Novelty Co	Sidney.

Pulleys and Conveyors.

Geo. L. Estes	Cuba.
Western Block Co	Lockport.
Huntley Mfg. Co	Silver Creek.
M. W. Reynolds	Whitesville.

Pumps.

Wm. C. Hill	Brasher Falls.
H. E. Hubbard Co	Dansville.
Eastern Mfg. Co	Elmira.
A. Wyckoff & Son Co	Elmira.
The Gowanda Pump Works	Gowanda.
Robert Hoes	Malden Bridge.
American District Steam Co	North Tonawanda.
A. A. Babcock Pump Co	Ogdensburg.
L. Curren & Son	Spring Lake.
Howard & Jennings	Syracuse.

Refrigerators and Kitchen Cabinets.

Heinz & Munschauer	Buffalo.
Jacob Jaeckle Furniture Co	Buffalo.
The Jewett Refrigerator Co	Buffalo.
P. A. Vogt Mfg Co	Buffalo.
Colonial Mantel & Refrigerator Co	Brooklyn.
Frederick Elflein & Sons	Brooklyn.
Greiner Const. Co	Brooklyn.
A. & M. Heckelmann	Brooklyn.
McKee Refrigerator Co	Brooklyn.
Manhattan Cabinet Works	Brooklyn.
Garland Refrigerator Co	Mt. Vernon.
Lorillard Refrigerator Co	Mt. Vernon.
Bohn Syphon Refrigerator Co	New York.
Buzzini & Co	New York.
Dubois Mfg. Co	New York.
Anton Larson & Son	New York.
James McLean	New York.
L. H. Mace & Co., Inc	New York.
William Williams & Co	New York.
Wicker Lumber Co	Niagara Falls.
Orchard Park Planing Mill Co	Orchard Park.
C. W. Trotter Sons	Rochester.
Hart & Beebe	Rose Hill.
F. L. Knowles Casket Co	Wellsville.

Rollers, Shade and Map.

F. M. Hoy	Brainerdsville.
John Kroder & Henry Reubel Co	Brooklyn.
Minetto-Meriden Co	Minetto.
Columbia Western Mills	New York.
Flos Shade Roller Co	Odgensburg.
Parish Fiber & Broom Co	Parish.

Sash, Doors, Blinds and General Mill Work.

O. D. Greene	Adams.
Fred L. Webster	Adams.
Park, Winton & True Co	Addison.
L. Belger	Akron.
Geo. Brown	Akron.
Blakeslee Lumber Co	Albany.
The William H. Burton Co	Albany.
Laib Bros	Albany.
Thos. Stephens & Sons	Albany.
C. M. Mallory	Albion.
Garlock Bros	Alexandria Bay.
Wm. H. Hall	Allegany.
Geo. C. Broadbooks	Attica.
M. B. Hasley	Alvord.
Willson & Eaton Co	Amenia.
Chris. S. Mergell	Amityville.
Brookside Lumber Co	Amsterdam.
Francis Gilliland's Sons	Amsterdam.
Henry C. Grieme	Amsterdam.
Kelly-Brayton Co	Amsterdam.
McNeil Mfg. Co	Amsterdam.
W. M. Sheflin	Angola.
Geo. D. Bethel	Antwerp.
The Arcade Planing Mill Co	Arcade.
Tisdale Lumber Co	Astoria.
John L. Alnutt	Auburn.
L. R. Carl	Auburn.
A. E. Norton	Augusta.
Chas. Wood & Co	Babylon.
W. R. Prouty	Bainbridge.
Charles Baker	Baker's Mills.
F. D. Smith	Baldwin.
Dennis Manogue	Ballston.
Striever Lumber Co	Ballston.
The Batavia & N. Y. Woodworking Co	Batavia.
Wade & Uphill	Batavia.
Jones Bros. & Parker	Bath.
Chas. E. Kirkup	Bayshore.
Belmont Lumber Co	Belmont.
Bartlett & Co	Binghamton.
Junius F. Bishop	Binghamton.
James O'Neil	Binghamton.
A. Roberson & Son	Binghamton.
Claremont E. Smith & Co	Binghamton.
Chas. E. Snell	Black River.
Parker & Root	Bolivar.

Barber & Robinson	Bolton Landing.
Bolton Landing Lumber Co	Bolton Landing.
H. R. Loveland	Boonville.
Fred N. Capell	Brasher Falls.
G. B. Hubbell	Brewster.
Crandall Panel Co	Brocton.
Brocton Hardware Lumber Co	Brocton.
George Alexander Co	Brooklyn.
Brooklyn Fireproof Sash & Door Co	Brooklyn.
Cohen & Gran	Brooklyn.
Colonial Mantel & Refrigerator Co	Brooklyn.
Columbia Mantel Co	Brooklyn.
John C. Creveling	Brooklyn.
Cross, Austin & Ireland Lumber Co	Brooklyn.
Eastern District Furniture & Lumber Co	Brooklyn.
Eastern Woodworking Co	Brooklyn.
Eastern Mantel Co	Brooklyn.
East New York Wrecking Lumber Co	Brooklyn.
Empire City Girard Co	Brooklyn.
A. Entenman, Inc	Brooklyn.
I. Feldman	Brooklyn.
Fisher & Voorhees	Brooklyn.
Flemish Art Co	Brooklyn.
C. B. French Cabinet Co	Brooklyn.
D. P. Gardner & Son	Brooklyn.
Greenport Sash & Door Co	Brooklyn.
Benj. G. Hitchings	Brooklyn.
Frank Hockin	Brooklyn.
Interborough Sash & Door Co	Brooklyn.
S. Jacobs & Sons	Brooklyn.
Kwilandzik & Alpert, Inc	Brooklyn.
Levin Kronenberg & Co	Brooklyn.
John S. Loomis Co	Brooklyn.
C. R. McCanlay Co	Brooklyn.
Michael Mayer	Brooklyn.
Frank A. Maron Co., Inc	Brooklyn.
Meisel-Danowitz Co	Brooklyn.
Meisel Muschel & Co	Brooklyn.
Jacob Morganthaw & Sons	Brooklyn.
A. Morkinson	Brooklyn.
Albro J. Newton Co	Brooklyn.
Osborn Sash & Door Co	Brooklyn.
C. H. Pearson	Brooklyn.
Prospect Parquet Floor Co	Brooklyn.
Prims & Klein	Brooklyn.
V. E. Reich	Brooklyn.
Reliance Fireproof Door Co	Brooklyn.

Rilate & Parker	Brooklyn.
The Roebuch Weather Strip & Wire Screen Co.	Brooklyn.
Rubin Graw Co	Brooklyn.
J. Schindele's Sons	Brooklyn.
Stanley & Unckles, Inc	Brooklyn.
Samuel Weinstein Est	Brooklyn.
Brownville Ventilated Column Works	Brownville.
Chas. Boller & Sons Co	Buffalo.
Buffalo Grille Co	Buffalo.
Buffalo Mantel Mfg. Co	Buffalo.
Dohn, Fissher & Beyer	Buffalo.
G. Elias & Bros	Buffalo.
Christian Flierl	Buffalo.
John E. Granzeback	Buffalo.
E. M. Hager & Sons Co	Buffalo.
John W. Jones	Buffalo.
Montgomery Bros. Co	Buffalo.
William Neubecker	Buffalo.
Pierce Arrow Motor Car Co	Buffalo.
Geo. F. Sowerby	Buffalo.
J. W. Slattery	Buffalo.
Steul & Thuman Co	Buffalo.
Stuhlmiller Mantel Works	Buffalo.
M. Zeis & Sons	Buffalo.
Geo. M. Zimmermann	Buffalo.
L. A. Miller	Cairo.
Martin Herman	Callicoon.
Geo. W. Dane	Camden.
William Garratt	Canandaigua.
Geo. T. Thompson	Canandaigua.
Gardner & Veitch	Canton.
Judd W. Rushton	Canton.
C. M. Starkweather	Carthage.
Catskill Supply Co	Catskill.
T. W. Thayer Co	Cazenovia.
Wm. Bihl	Central Islip.
D. W. Smith	Central Square.
John Earl	Champlain.
C. L. Sancomb	Chateaugay.
The O'Dell & Eddy Co	Chafee.
Geo. Diefendorf	Chaumont.
C. J. Armstrong & Sons	Cherry Valley.
Geo. Wales & Son	Cherry Valley.
Norman H. Wikoff	Cherry Valley.
Swan Bros.	Chestertown.
Wm. O. Schwarzwaelder	Chichester.
W. A. Briggs	Claryville.

Otis Brooks Lumber Co.	Clayton.
Robert C. Brockway	Clinton.
Clymer Door, Sash & Lumber Co.	Clymer.
H. D. Karker & Co.	Cobleskill.
A. J. Griffin & Son	Cohoes.
Universal Woodworking Co.	Cohoes.
Kraemer Bros. Co.	College Point.
U. S. Metal Products Co.	College Point.
Johengen, Johnson & Schwitz	Collins Center
Francis M. Fox	Colliersville.
Mullin, Wagner & Co.	Coney Island.
E. W. Clapp	Conewango Valley.
John F. Brady & Co.	Cooperstown.
H. E. Lewis & Co.	Cooperstown.
The Corning Bldg. Co.	Corning.
Warner & Phillips	Corning.
Mead & Craft Co.	Cornwall Landing.
H. F. Benton Lumber Co.	Cortland.
Bush & Glover	Cortland.
E. S. Vickler	Croghan.
Phelps & Sibley Co.	Cuba.
Clinton Prison	Dannemora.
Goo & Hopkins	Delevan.
Dexter Woodworking & Builders Supply Co.	Dexter.
Chas. Selkirk	Duane.
Sable Bros.	Dundee.
Madigan Lumber Co.	Dunkirk.
O'Donnell Lumber Co.	Dunkirk.
W. H. Geib	East Aurora.
S. H. Peck	East Aurora.
Henry W. Masten	East Galway.
East Hampton Lumber & Coal Co.	East Hampton.
Irving W. Tenhill	East Marion
Henry W. Burt	East Northport.
Charles Davison	East Rockaway.
Eden Planing Mill Co.	Eden Center.
E. L. Ackerman	Edmeston.
Wm. H. Deyo	Ellenville.
Dwight Divine & Sons	Ellenville.
C. H. Sheeley	Ellenville.
Lobbell Bros.	Elizabethtown.
Geo. W. Dibbell	Elka Park.
Harris, McHenry & Baker Co.	Elmira.
Kertscher & Co., Inc.	Elmira.
H. C. Spaulding Co.	Elmira.
J. L. Richardson	Elton.
Light-Unkefer Co.	Endicott.

S. W. Smith & Son	Eureka.
C. J. Peters	Fabius.
Fairport Lumber & Coal Co	Fairport.
Jamestown Mantel Co	Falconer.
H. L. Post	Farmingdale.
C. W. Copp	Flushing.
Francis L. Fountain	Forestport.
Berray & Benedict	Franklin.
John Luke	Fredonia.
Sackett Screen Co	Fredonia.
Sly & Coddington	Fredonia.
T. R. Bryant	Freeville.
Empire Sash & Door Co	Friendship.
Geo. Deis Son & Co	Fulton Chain.
H. A. Irmler	Gardenville.
Webster C. Woodworth	Gasport.
J. G. Henry	Geneva.
Williams Lumber Co	Geneva.
J. T. Winfield	Germantown.
W. Johnson	Glenfield.
Gifford Lumber Co	Glens Falls.
Kendrick & Brown Co	Glens Falls.
R. R. Norton	Glens Falls.
Holden Lumber Co	Gloversville.
Forbush Planing Mill Co	Gowanda.
W. Cronk	Grand Gorge.
Fred Potter	Granville.
Wood Mfg. & Realty Co	Great Neck.
C. A. Corwin	Greenport.
C. V. Fanning	Greenport.
Jos. H. Swezey	Greenport.
G. M. Woodward	Greenwood.
Crosby Kelly	Griffin Corners.
Hamburg Planing Mills Co	Hamburg.
The Home Lumber Co	Hamburg.
Hamilton Lumber Co	Hamilton.
Harriam Industrial Corporation	Harriman.
Clark & Bennett Lumber Co	Haverstraw.
William Plyer & Co	Hampstead.
B. Thomas	Hampstead.
J. H. Haney	Hensonville.
Murray A. Babcock	Hermon.
Chas. H. Voigt Estate	Hicksville.
F. A. Jones	Holcomb.
Holland Planing Mill Co	Holland.
J. M. Duetsch Co	Hornell.
McConnell Mfg. Co	Hornell.

Chas. W. Macy	Hudson.
Wm. H. Traver & Son	Hudson.
L. H. Weaver	Hudson.
Griffin Lumber Co	Hudson Falls.
Huntington Sash & Door Co	Huntington.
Robertson Bros	Huntington.
Edward Hope	Hurleyville.
E. Seibert	Hurleyville.
Conrad Klipple	Ilion.
Remington Arms & Ammunition Co	Ilion.
Remington Typewriter Co	Ilion.
Geo. Kaiser	Inwood.
Lord & Burnham Co	Irvington-on-Hudson.
Driscoll Bros. & Co	Ithaca.
Cornell Univ., Repair Dept	Ithaca.
Wyckoff Lumber & Mfg. Co	Ithaca.
John R. Carpenter Co	Jamaica.
American Carving Works	Jamestown.
Jamestown Window Screen Co	Jamestown.
Munson & Johnson	Jamestown.
Nelson Bros,	Jamestown.
Watson Mfg. Co	Jamestown.
Est. of John T. Wilson	Jamestown.
D. B. Stevens	Johnsonville.
P. M. Simmons	Johnstown.
Jonah Hess	Johnstown.
W. S. Sammons	Johnstown.
L. Stephenson	Johnstown.
Stephenson & Newner	Johnstown.
Younglove Lumber Co	Johnstown.
R. Prescott & Son	Keeseville.
Nichols Bros	Kennedy.
Oneida Community Co., Ltd	Kenwood.
E. D. & P. Hilsinger	Killawog.
A. R. Courtant	Kingston.
Albert Manterstock	Kingston.
J. A. Mulhern	Kingston.
H. W. Palen's Sons	Kingston.
West Seneca Lumber Co	Lackawanna City.
W. S. Worden	Lake George.
Lake Placid Co	Lake Placid Club.
Jacob B. Oehm	Lancaster.
John V. Knouber	Lancaster.
H. S. Lane	Lanesville.
J. Lapp	LeRoy.
F. C. Rogers	LeRoy.

Lestershire Lumber & Box Co.	Lestershire.
F. S. Grant	Liberty.
Gurnsey Rampe	Liberty.
Andrew Little & Son	Little Falls.
P. H. Woolsey Co	Livingston Manor.
W. G. Damerow	Lockport.
Lock City Pattern Works	Lockport.
S. P. McCloy	Lockport.
Joseph W. Turner	Lockport.
Joseph Whalen	Lockport.
Henry Peake	Long Eddy.
A. M. Chandler	Long Eddy.
De Long Woodworking Co.	Long Island.
The Kalamen Co	Long Island.
Manhattan Grill & Fret Works Co	Long Island.
J. C. Gray & Co	Lyndonville.
William C. Aul	Lyons.
Frank Hoskins	Lyons Falls.
Wm. J. Van Dewater Est	Machias.
Geo. A. Courbat	Mallory.
C. H. Dupree	Malone.
Malone Lumber Co	Malone.
Smallman & Spencer	Malone.
Geo. Webster Lumber Co	Malone.
Mamaroneck Sash, Door & Trim Co	Mamaroneck.
W. L. Pratt	Massena.
Wines & Homan	Mattituck.
Hudson & Co	Mattituck.
Wm. Barber	Mechanicville.
A. D. Strang	Mechanicville.
J. W. Jackson & Co	Medina.
J. J. Vault	Mexico.
Wm. Almy	Middleburg.
Goodrich Factory	Middleburg.
S. C. West	Middleburg.
C. J. Armstrong & Sons	Milford.
Swift Brothers	Millbrook.
Witherbee, Sherman & Co	Mineville.
I. O. Smith	Monticello.
Stephen Trowbridge	Monticello.
Henry Washington	Monticello.
Henry W. Whipple	Monticello.
R. J. Rennie	Mooers Forks.
Ralph L. Teeter	Moravia.
F. M. Purdy	Morrisonville.
Fred J. Petrie	Morristown.
Wm. L. Field	Morrisville.

D. F. Dakin & Co	Mount Kisco.
Mt. Kisco Wood Working Co	Mount Kisco.
J. B. Turner	Mount Kisco.
August W. Blau	Mt. Vernon.
Burton & Fenton	Mt. Vernon.
Garland Refrigerator Co	Mt. Vernon.
Kapp & Nordholm	Mt. Vernon.
L. Vinton & Sons	Mt. Vernon.
Southern Lumber Co	Mt. Vernon.
Wilson & Adams	Mt. Vernon.
J. T. Petheck	Narrowsburg.
Bert Budlong	Natural Bridge.
S. W. Keener Co	Newark.
John Tisse	New Bremen.
Newburgh Planing Mill Co	Newburgh.
Daniel S. Tuthill	Newburgh.
J. C. White	Newburgh.
Newfane Basket & Mfg. Co	Newfane.
Crawford Romain Co	New Rochelle.
J. A. Mahlstedt Lumber & Coal Co	New Rochelle.
New Rochelle Coal & Lumber Co	New Rochelle.
Abramson & Engesser Co	New York.
American Mantel Mfg. Co	New York.
American Wood Carpet Flooring Co	New York.
Wm. Anderson	New York.
Atlantic Coast Lumber Corporation	New York.
Bayer Cotton Co	New York.
Beekman Sash, Door & Woodworking Co	New York.
Charles F. Biele & Sons Co	New York.
William D. Bird	New York.
John H. Boynton	New York.
Bronx Sash & Door Co	New York.
John H. Carl	New York.
Century Cabinet Co	New York.
A. C. Chesley Co	New York.
Chautauqua Planing Mill Co	New York.
Claremonth Lumber & Mfg. Co	New York.
Colonial Column Mfg. Co	New York.
John Cronk & Sons	New York.
William L. Dale	New York.
Electric Fireproofing Co	New York.
Empire City Gerard Co	New York.
Empire Door & Trim Company	New York.
Eureka Woodworking Co	New York.
Thomas Farrell	New York.
G. Fenante	New York.
Fischer Bros	New York.

James C. Forbes..... New York.
Glaser, Rohrer & Co..... New York.
Globe Fireproof Door & Sash Co..... New York.
Greater N. Y. Sash & Door Co..... New York.
Harlem River Lumber & Woodworking Co..... New York.
Hogan & DiGenno..... New York.
Howell, Field & Goddard, Inc..... New York.
H. F. Huber & Co..... New York.
Hudson Mantel & Mirror Co..... New York.
Hudson Woodworking Co..... New York.
Jamestown Mantel Co..... New York.
L. Kantor & Co..... New York.
The W. Keck & Co..... New York.
L. Kern..... New York.
Kessler Bros..... New York.
Charles H. Keys..... New York.
A. Kimball & Sons..... New York.
G. W. Koch & Son..... New York.
Kalt Lumber Co..... New York.
Chas. Krohn..... New York.
J. & R. Lamb..... New York.
The Lorillard Refrigerator Co..... New York.
P. McCarthy..... New York.
McConnell Mfg. Co..... New York.
Mandel-Williams Lumber Co..... New York.
Manhattan Fireproof Door Co..... New York.
J. Marcus Woodworking Co..... New York.
Louis Marx & Son..... New York.
H. H. Meise..... New York.
F. R. Merrell & Son..... New York.
Mount & Robertson..... New York.
Tuttle Bros..... New York.
Niagara Woodworking Co..... New York.
M. F. O'Neill, Inc..... New York.
Oriental Fireproof Sash & Door Co..... New York.
T. G. Patterson Lumber Co..... New York.
Pioneer Woodwork Co..... New York.
Perry & Son..... New York.
Chas. A. Pope..... New York.
Potter & Stymus Co..... New York.
Chas. Read..... New York.
Chas. E. Reynolds..... New York.
Arthur J. Rieser & Co..... New York.
Roebuck Weather Strip & Wire Screen Co..... New York.
J. & W. Robb..... New York.
H. B. Rummler..... New York.
The Sandhop Contracting Co..... New York.
J. M. Saulpaugh's Son..... New York.

F. Schaettler	New York.
P. Scollon	New York.
Shollenberger & Co	New York.
Star Fire Proof Door & Sash Co., Inc	New York.
C. S. Utterson	New York.
Tiger & Dreeben	New York.
The Unionport Lumber & Mfg. Co	New York.
United Metal-covered Door & Sash Co	New York.
United Parquet Flooring Co	New York.
U. S. Metal Products Co	New York.
Valiquet & Neelson	New York.
Herman Vossnack	New York.
A. Weinstock	New York.
Westchester Woodworking Co	New York.
Alfred Wick	New York.
James G. Wilson Mfg. Co	New York.
Wilson Woodworking Co	New York.
F. E. Zimmerman	New York.
Ayers & Witmer	Niagara Falls.
Haeberle Lumber Co	Niagara Falls.
August Steinbrenner	Niagara Falls.
Wicker Lumber Co	Niagara Falls.
S. W. Johnson & Son	Nichols.
Plumb & Cochrane Co	Norfolk.
Geo. L. Klinger	North Branch.
Jas. R. Richardson & Son	North Lawrence.
The Northport Lumber & Coal Co	Northport.
Dock & Mill Co	North Tonawanda.
The Chas. G. Doebler Planing Mill	North Tonawanda.
W. G. Palmer	North Tonawanda.
Thompson, Hubman & Fisher	North Tonawanda.
Charles E. Gue	North Western.
W. L. Scott Lumber Co	Norwich.
R. D. Reed	Norwood.
H. Nelson Brown	Ogdensburg.
Landon A. Green	Ogdensburg.
Proctor Mfg. Co	Ogdensburg.
W. J. Pooler	Ogdensburg.
Olean Glass Co	Olean.
Olean Planing Mill Co., Inc	Olean.
A. Weston Lumber Co	Olean.
W. R. Wright Mfg. Co	Olean.
N. H. Briggs & Son	Oneonta.
McFee & Borst	Oneonta.
Orchard Park Planing Mill Co	Orchard Park.
Isaac Terwilliger's Sons	Ossining.
James C. Harding & Son	Oswego.
Oswego Novelty Works	Oswego.

Post & Henderson Co.	Oswego.
S. E. Fournier	Oswego.
C. J. Wiley	Oswego.
Lane Bridge Co	Painted Post.
E. Bailey & Sons, Inc.	Patchogue.
Pendleton & Townsend	Patterson.
Pavilion N. T. G. Co.	Pavilion.
Wm. Brotherton's Sons	Peekskill.
Chas. A. Lamas	Peekskill.
Phillips & Requa	Peekskill.
A. Mason & Sons	Peru.
M. Davenport	Peterboro.
Groat Furniture Co.	Philadelphia.
J. W. Elvey	Phœnicia.
A. J. Beardsley	Pitcher.
The LaCroix Sash & Door Co.	Plattsburg.
Loper Bros.	Port Jefferson.
W. W. Hendrickson Co.	Port Jervis.
Geo. W. Post	Port Leyden.
Wm. C. Van Clief	Port Richmond.
Willard Conklin	Port Richmond.
B. T. Fairchild & Co.	Portville.
Grant St. Planing Mill	Potsdam.
Brooks & Co.	Poughkeepsie.
Levi Lumb's Son	Poughkeepsie.
New York Portable Bungalow Co.	Poughkeepsie.
T. E. Ringrose	Prattsburg.
Stephen Brazee	Preston Hollow.
Chas. Tollner's Sons Co.	Pulaski.
W. M. Wilder	Pulaski.
Cook & Smith	Redwood.
Chase Mills & Supplies	Richfield Springs.
W. C. Hangoard Co.	Richmond Hill.
A. A. Gates	Richville.
Charles Skidmore	Riverhead.
Banteleon Bros. Co.	Rochester.
Chapman & Goetzman	Rochester.
Crouch & Beahan Co.	Rochester.
P. Enders	Rochester.
Hopeman Bros. Lumber & Mfg. Co.	Rochester.
Rochester Cabinet Co.	Rochester.
Rochester Trim Co.	Rochester.
C. H. Rugg Co.	Rochester.
Smith Sash & Door Co.	Rochester.
Spencer Lumber Co.	Rochester.
Geo. H. Stalker	Rochester.
Traders Box & Lumber Co.	Rochester.
Vogel & Binder Co.	Rochester.

Wood-Mosaic Co	Rochester.
Williamson Mill & Lumber Co	Rochester.
Chas. Crabbe Co	Rockaway Beach.
Beach Lumber Co	Rome.
E. Comstock	Rome.
Walter Sherwood	Roscoe.
Isaac T. Watson	Roscoe.
Conklin Tribby Conklin	Roslyn.
Isaac Hicks	Roslyn.
G. H. Cleveland	Sag Harbor.
Joseph Fahys & Co	Sag Harbor.
John H. Kneeskern & Sons	St. Johnsville.
W. J. Cruikshank	Salem.
Chas. Gressel	Salisbury.
Kingsby Bros	Salisbury Center.
Branch & Callanan	Saranac Lake.
H. J. Hammond	Saratoga Springs.
Veeder & Brown	Schenectady.
Bursley Merenes	Seward.
C. MacFee	Seward.
Vosburgh Bros	Shady.
G. A. Clask Co	Sidney.
Norman B. Sheppard	Skaneateles.
F. C. Bowm	Skerry.
Leroy Rowley	Sloansville.
F. G. Booth	Smithtown Branch.
W. L. Purple	South Columbia.
Frederick Olmstead	South Fallsburg.
J. C. McMillan	South Otselic.
E. O. Fordham	Speonk.
Geo. Herbold	Springville.
Henry Salzler	Springville.
L. J. Shuttleworth	Springville.
Delaware Valley Feed & Lumber Co	Stamford.
Nicholas Lauterbach	Stapleton.
Louis Scherer	Stapleton.
D. F. Bayles & Sons	Stony Brook.
Hueber Bros	Syracuse.
Frazier & Wilcox	Syracuse.
E. M. Klock & Sons	Syracuse.
John H. Lyons	Syracuse.
Markert Mfg. Co	Syracuse.
John J. Sherlock	Syracuse.
Wm. Sherlock	Syracuse.
E. C. Stearns & Co	Syracuse.
Syracuse Woodcrafters	Syracuse.
Adam Theobold	Syracuse.
Tuck Woodworking & Bldg. Co	Syracuse.

Syracuse Corner Block Factory	Syracuse.
Alfred Blonin	Tarrytown.
Ira S. Conover	Tarrytown.
William O. Sutton	Tarrytown.
A. Gleason	Troupsburg.
Russell L. Merwin	Towahloondah.
Madden Lumber Co	Troy.
William Hasard	Trumansburg.
T. D. Wadelton Co	Tuckahœ.
Hugh Hughes	Turin.
C. H. Backus	Unadilla Forks.
Chas. C. Kellogg & Sons Co	Utica.
Amos Nellis & Swift	Utica.
Philip Thomas & Sons	Utica.
The N. A. Tyler Lumber Co	Vernon.
Waterloo Sash & Door Co	Waterloo.
Case Lumber & Roofing Co	Watertown.
Charlenois Bros	Watertown.
E. A. Wheeler	Waterville.
James T. Young	Watervliet.
Wolff Lumber Co	Wayland.
O'Dell Bros	Webster.
Oak Duke Lumber Co	Wellsville.
F. L. Knowles Casket Co	Wellsville.
Geo. S. Weeks	West Winfield.
Westfield Lumber & Coal Co	Westfield.
L. H. Cross & Sons	Westport.
Geo. N. Gibson & Son	West Stockholm.
E. F. Gervitz	West Valley.
J. H. Fournier Planing Mill Co	Whitehall.
Kelsey Smith & Co	White Plains.
The White Plains Trim Co	White Plains.
Denton & Waterbury	Whitesboro.
Wm. J. Soper	Windham.
Manhattan Fire Proof Door Co	Winfield Jct.
G. S. Van Buskirk	Wiscoy.
Hadsell Bros	Worcester.
Arnett O. Lawrence	Yonkers.
F. B. Mee	Yonkers.
S. F. Quick & Sons	Yonkers.
John Weber	Yulan.

Shuttles, Spools and Bobbins.

Frary Spool Co	Berlin.
Cohoes Union Bobbin Co	Cohoes.
Glenfield Mfg. Co	Glenfield.
Lestershire Spool & Mfg. Co	Lestershire.
Frederick Olmstead	South Fallsburg.

Signs and Supplies.

Laib Bros	Albany.
Shaw Woodworking Co	Brooklyn.
Stanford Crowell Co	Ithaca.
Mellen & Waboda	Mineola
Chas. Krohn	New York.

Sporting and Athletic Goods.

M. J. Bernhard	Buffalo.
Wm. Dethloff	Buffalo.
John F. Clark	Florence.
Koones & Co	Livingston.
Thaler Bros	Lyons Falls.
W. H. Plumb	Malone.
Bell, Sandford & Lahm	New York.
The Brunswick-Balke Collender Co	New York.
Bubeck & Guerin	New York.
Alfred B. Marx & Bro	New York.
Rilper Mfg. Co	New York.
H. Wagner & Adler Co	New York.
William H. Plumb & Son	North Bangor.
J. W. Elvey	Phœnicia.
Frank Schwikert & Son	Rochester.
Retter Ainslie	Roscoe.
B. F. Gladding & Co	South Otselic.
J. D. Babcock	Syracuse.
C. L. Castle	Syracuse.

Tanks and Silos.

C. M. Mallory	Albion.
Green Bros	Ashville.
Batavia Machine Co	Batavia.
H. R. Loveland	Boonville.
Becker Tank Mfg. Co	Brooklyn.
Mayer Tank Mfg. Co	Brooklyn.
National Cooperage Co	Brooklyn.
J. A. Scobell	Cape Vincent.
L. Knott & Co	Cassadaga.
Robert C. Brockway	Clinton.
S. H. Peck	East Aurora.
Nicholas Bower	Gasport.
C. F. Bushnell	Gilbertsville.
Holland Planing Mill Co	Holland.
D. W. Palmer	Hubbardsville.
Driscoll Bros. & Co	Ithaca.
D. B. Stevens	Johnsonville.
F. C. Rogers	Le Roy.
Adirondack Silo Co	Malone.

Geo. Raithel & Son	Middleville.
Goodrich Factory	Middleburgh.
Wilson & Adams	Mt. Vernon.
Newfane Basket & Mfg. Co	Newfane
Thomas Farrell	New York.
David Isaacs	New York.
Launer Bros.	New York.
Shwab Bros. Co	New York.
Thompson, Hubman & Fisher	N. Tonawanda.
Van Slyke & Co	N. Tonawanda.
W. L. Scott Lumber Co	Norwich.
Carley Heater Co	Olean.
Post & Henderson Co	Oswego.
T. J. Parry	Remsen.
Hopeman Bros. Lbr. & Mfg. Co	Rochester.
Spencer Lumber Co	Rochester.
Yawman & Erbe Mfg. Co	Rochester.
Joseph Fahys & Co	Sag Harbor.
Adelbert Weller	Salt Spring Mill.
Sandy Creek, N. Y., Wood Mfg. Co	Sandy Creek.
Saratoga Silo Mfg. Co	Saratoga Springs.
J. E. Davis & Son	Sauquoit.
Daniel Vunk	Sloansville.
Lyons Mills	Solsville.
Gould Storage Battery Co	Syracuse.
J. W. VanCott & Son	Unadilla.
E. B. Lacey	Union.
The Abraham Walrath Co	Weedsport.
Geo. S. Weeks	West Winfield.
H. B. Reynard	Whitney Crossing.

Toys.

The Embossing Company	Albany.
James F. Wilbur	Berkshire.
Wilkinson Mfg. Co	Binghamton.
L. Moeller's Sons	Buffalo.
A. C. Cheney Piano Action Co	Castleton.
C. J. Armstrong & Sons	Cherry Valley.
E. U. Scovill Co	Manlius.
C. J. Armstrong & Sons	Milford.
Oskar Martin	Nanuet.
Buffalo Sled Co	N. Tonawanda.
National Advertising Co	Seneca Falls.
Walton Toy Co	Walton.
August Guntlow, Jr	Woodbourne.

Trunks and Valises.

Bingham Trunk Co	Buffalo.
Buffalo Trunk Mfg. Co	Buffalo.

R. H. Hoyt	Buffalo.
Manhattan Trunk Co	New York.
Charap & Mark	New York.
F. R. Merrall & Co	New York.
New York Trunk Box Factory	New York.
C. A. Taylor Trunk Works	New York.
Henry Likly & Co	Rochester.
Syracuse Trunk Works	Syracuse.
H. C. Faber & Son Co	Utica.
The N. A. Tyler Lumber Co	Vernon.

Vehicles and Vehicle Parts.

J. S. Harrison & Co	Addison.
Janice Gould Co	Albany.
Kingsbury-Leahy Co	Albany.
Knox & Shaible	Albany.
A. Mosher & Sons	Albany.
Seim & Reissig	Albany.
E. F. Smith	Allegany.
Horton Lumber Co	Altmar.
Willis Kinyon	Amber.
F. E. Hobert	Apulia.
B. F. Dailey & Sons	Atlanta.
The Eagle Wagon Works	Auburn.
George F. Wills	Auburn.
A. E. Norton	Augusta.
Avoca Wheel Co	Avoca.
W. E. Cole	Avon.
R. C. Waldo	Avon.
B. H. Norton	Bainbridge.
W. R. Prouty	Bainbridge.
L. W. Keeler & Sons	Bangor.
Batavia Machine Co	Batavia.
H. V. Watkins	Bellport.
A. L. Davis' Sons	Binghamton.
McMahon Wagon Co	Binghamton.
Sturtevant-Larrabee Co	Binghamton.
Barber & Robinson	Bolton Landing.
Caley & Nash	Brighton.
Rochester Wheel Co	Brockport.
Thos. Rockford	Brooklyn.
Shadbolt Mfg. Co	Brooklyn.
J. A. Shephard & Son	Brooklyn.
The American Body Co	Buffalo.
Atterbury Motor Car Co	Buffalo.
J. M. Blake & Son	Buffalo.
Bosche Bros.	Buffalo.
Brunn's Carriage Mfg. Co	Buffalo.

Buffalo Auto Body & Trimming Co	Buffalo.
Buffalo Elecric Vehicle Co	Buffalo.
Duchman Wagon Co	Buffalo.
G. Elias & Bros	Buffalo.
Fisher & Kam	Buffalo.
Anthony J. Grad	Buffalo.
C. J. Handel	Buffalo.
Henry Landshefts	Buffalo.
Peter Lesswing's Sons	Buffalo.
L. Noeller's Sons	Buffalo.
Pierce Arrow Motor Car Co	Buffalo.
John F. Vogt	Buffalo.
C. J. Meeker	Camden.
William Garratt	Canandaigua.
Watson Wagon Co	Canastota.
E. Q. Dutton & Co	Cato.
E. Kennedy	Cato.
Peter Swab	Chatham.
Geo. H. Brooks	Chester.
S. Wilkin & Sons	Chester.
Robert C. Brockway	Clinton.
Swarthout Mfg. Co	Clinton.
H. W. Sutton	Clintondale.
M. B. Hawley	Colton.
The Steam Mill Co	Constableville.
S. F. Benton Lumber Co	Cortland.
Cortland Carriage Goods Co	Cortland.
W. H. Newton & Son	Cortland.
Chas. L. Huber	Delhi.
G. H. Caples	Dresden.
Goble Bros.	Dundee.
The Mulholland Co	Dunkirk.
The Parsons Wagon Co	Earlville.
Neenan Bros.	E. Bloomfield.
Henry W. Mastin	East Galway.
E. D. Satterlee	East Otto.
S. R. Sikes & Son	East Otto.
M. E. True & Son	East Pembroke.
Lobdell Bros.	Elizabethtown.
Geo. W. Dibbell	Elka Park.
Am.-La France Fire Engine Co	Elmira.
John T. Ayres	Elmira.
Charles Bartholomew	Etna.
G. G. Bown & Son	Fairport.
E. Moran	Far Rockaway.
Peattie Bros.	Fishkill on the Hudson.

Geo. S. Monroe	Freeville.
Webster C. Woodworth	Gasport.
Frank Cram	Geneva.
Geneva Wagon Co	Geneva.
W. J. Fox	Glen Head.
Joubert & White	Glens Falls.
Miller Cart Co	Goshen.
The Gowanda Pump Works	Gowanda.
Schenck Bros.	Great Neck.
Jason Weeks	Greenwood.
B. A. Evans	Hammond.
J. Klein & Co	Hancock.
B. Brown (Suc. to Q. W. Valentine)	Hempstead.
Holland Pl. Mill Co	Holland.
L. F. Tanner	Holland.
W. M. Brockway	Homer.
A. W. Phillips	Hopkinton.
John Horton	Horseheads.
The Sibley Co	Hudson.
Robertson Bros.	Huntington.
C. R. Doremus	Irvington.
Pritchard & Sons	Ithaca.
Dibble Spoke Co	Jacob.
Salisbury Wheel & Mfg. Co	Jamestown.
L. Stephenson	Johnstown.
Jordan Wheelbarrow Co	Jordan.
E. D. & P. Hilsinger	Killawog.
Hendricks Hay Press Co	Kingston.
John W. Mayer	Kingston.
H. S. Lane	Lanesville.
L. W. Roseboom	Limerick.
Jacob Dettinger & Son	Little Falls.
W. D. Davis	Lockport.
Brewster & Co., Inc	Long Island City.
General Vehicle Co	Long Island City.
Joseph Huber	Long Island City.
George W. Buisch & Son	Lyons.
Philip Deuchler & Sons	Lyons.
David Crump	Madrid.
Perkins Lockwood	Madrid.
Geo. E. Norton	Maine.
C. A. Lind & Son	Morton.
Blaisdell Sperry Mfg. Co	Martville.
S. D. Jackson	Matteawan.
H. S. Fuller	McLean.
Everts Mfg. Co	Meridian.
David R. Wagner	Meridian.

Willis Halsted	Middleport.
D. B. Crist	Middleville.
Geo. Raithel & Son	Middleville.
Mellon & Waboda	Mineola.
A. H. Flint	Moira.
G. S. Cady & Co	Moravia.
Wm. L. Field	Morrisville.
J. B. Turner	Mt. Kisco.
Everett Manufacturing Co	Newark.
The Haywood Wagon Co	Newark.
Wayne Wheel Co	Newark.
Arthur Colvill	Newburgh.
J. C. Hilliker	Newburgh.
Otto Nott	Newburgh.
George Anthon	New York.
Burr & Co	New York.
A. T. Demarest & Co	New York.
Wm. Doherty & Son	New York.
Richard G. Green	New York.
Geo. Irving Co	New York.
Wm. Keil	New York.
C. P. Ketterer	New York.
C. L. Knoeller	New York.
William Koenig	New York.
J. Kramer & Sons Mfg. Co	New York.
The Liberty Wagon Works	New York.
Lippard-Stewart (Motor Truck Co.)	New York.
Marquard Truck Co	New York.
Jacob Mattern Wagon Co	New York.
F. R. Messell & Co	New York.
D. P. Nichols & Co	New York.
Perry & Son	New York.
Peters & Heins	New York.
H. Reinmulder & Sons	New York.
Est. of Chas. Scheideler	New York.
Sebastian Wagon Co	New York.
Senderling Mfg Co	New York.
J. A. Shepard & Son	New York.
J. P. Sjoberg	New York.
John Thenser	New York.
A. Unger	New York.
Herman G. Wittowsky	New York.
Bert Budlong	Natural Bridge.
Newfane Basket Mfg. Co	Newfane.
Hobbs Bros.	Nineveh.
Plumb & Cochrane Co	Norfolk.
J. A. Falk	North Collins.

Buffalo Sled Co.	North Tonawanda.
John P. Smith	North White Lake.
New Conklin Wagon Co.	Olean.
F. J. Aubeuf	Oneida.
Theodore Barrett & Sons	Oneida.
August Schubert Wagon Co.	Oneida.
Schubert Bros. Gear Co.	Oneida.
Siver Carriage Co.	Oneida.
John J. Teal	Orchard Park.
Denton & Son	Oswego.
F. L. Raymond	Oswego.
F. J. Carpenter	Oxbow.
Barden & Robson	Penn Yan.
T. C. Ginney	Peterboro.
J. W. Elvey	Phœnicia.
The Whitten Mfg. Co.	Pine Bush.
L. H. Lusk	Pittsford.
W. Marshall	Plainville.
E. H. Stillman	Poland.
W. C. Woodford	Pompey.
A. Bentley	Port Jefferson.
Only Motor Car Co.	Port Jefferson Sta.
B. T. Fairchild	Portville.
F. I. A. T.	Poughkeepsie.
Thos. McWhennis	Poughkeepsie.
Reed & Forman	Poughkeepsie.
C. C. Kirkland	Pratts Hollow.
W. M. Wilder	Pulaski.
Thomas Callister	Queens.
Southard Bros.	Red Creek.
T. J. Parry	Remsen.
J. W. Reed	Remsen.
American Laundry Machy. Co.	Rochester.
Jas. Cunningham & Sons Co.	Rochester.
Deusing & Zieres	Rochester.
Hoffman Wagon & Carriage Co.	Rochester.
Geo. A. Lane	Rochester.
Fred C. Rehtz	Rochester.
W. H. Rowerdink & Son	Rochester.
A. F. & S. C. Stewart	Rochester.
Sullivan Bros.	Rochester.
S. N. Skinner & Son	Rockdale.
Fitch Gear Co.	Rome.
Conklin, Tutty & Conklin	Roslyn.
N. Forges	Roslyn.
Saltsman Wagon Co.	St. Johnsville.
Adelbert Weller	Salt Springville.

Jay B. Baker	Sanitaria Springs.
J. E. Davis & Sons	Sauquoit.
C. E. Palmer	Saratoga Springs.
E. Loucks & Co	Schenectady.
W. E. Warner	Schoharie.
Ellsworth Carver	Scottsville.
Glen Wagon Co	Seneca Falls.
Shortsville Wheel Co	Shortsville.
Cortland Cart & Carriage Co	Sidney.
A. J. Henpel	Silver Creek.
D. J. Van Vlack	Silver Creek.
Lyons Mills	Solsville.
Zoin Scheengauer	Stapleton.
D. F. Bayles Sons	Stony Brook.
Lee L. Hall	Stony Creek.
Chase Motor Truck Co	Syracuse.
H. H. Franklin Mfg. Co	Syracuse.
E. M. Klock & Sons, Inc	Syracuse.
Chas. Schlosser's Sons	Syracuse.
Syracuse Chilled Plow Co	Syracuse.
Maxwell Briscoe Motor Co	Tarrytown.
M. L. Stotler	Theresa.
Geo. Sullivan Mfg. Co	Troy.
Troy Carriage Works	Troy.
Max Richter	Ushers.
Bailey & Browne	Utica.
Phil. Hammes & Sons	Utica.
Walling's Carriage Works	Utica.
Willoughby & Co	Utica.
Jas. B. Crowell & Son	Wallkill.
Albert Smith	Walton.
Walton Foundry Co	Walton.
T. W. Ellis	Warren.
Steinbergh Bros.	Waterford.
Waterloo Wagon Co	Waterloo.
H. H. Babcock Co	Watertown.
Excelsior Carriage Co	Watertown.
Union Carriage & Gear Co	Watertown.
E. A. Wheeler	Waterville.
H. C. Becker	Watervliet.
Chas. Richenecker	Watervliet.
The Abram Walrath Co	Weedsport.
Geo. Siemon	West Shokan.
George J. Dueschel	West Walworth.
C. H. Rider & Son	West Winfield.
J. J. Misner	Woodbourne.

Whips, Canes and Umbrella Sticks.

J. Sarver	Stapleton.
J. W. Ventres & Co	Wanakena.
Arthur W. Ware & Co	New York.

Woodenware and Novelties.

Bacon & Co	Appleton & Gasport.
K. B. Mathes Co	Batavia.
W. W. Babcock Co	Bath.
Frary Spool Co	Berlin.
John J. Potter	Binghamton.
Black River Plug & Core Co	Black River.
J. M. Peter's Sons	Blacker.
J. K. Brown Co	181 3rd Ave., Brooklyn.
Wright L. Glidden	Brooklyn.
Buffalo Pail & Barrel Co	Buffalo.
M. L. & N. M. Howard	Cairo.
L. A. Miller	Cairo.
Adirondack Core & Plug Co	Carthage.
P. J. Burdett	Clifton.
Rhodes Chair Co	Cold Brook.
W. H. Rhodes	Cold Brook.
F. W. Barker	Coopers Plains.
E. B. Talbot	Cornwall-on Hudson.
Stanley C. Swift Mfg. Co	Cuba.
Delevan Mfg. Co	Delevan.
Geo. W. Dibbell	Elka Park.
Edgar Palmer	Freehold.
T. R. Bryant	Freeville.
White Mop Wringer Co	Fultonville.
Webster C. Woodworth	Gasport.
Glenfield Mfg. Co	Glenfield.
Catskill Mt. Souvenir Co	Hensonville.
R. J. Fairbanks	Hermon.
Holland Planing Mill Co	Holland.
Edward Hope	Hurleyville.
E. Seibert	Hurleyville.
Edward L. Gassett	Jamestown.
E. D. & P. Hilsinger	Killawog.
W. L. Lewis	Lisle.
Jacob Dettinger & Son	Little Falls.
Mrs. L. Marta	Mahopac.
A. S. Coles	Mamaroneck.
A. A. Clark & Sons	Marion.
Deright & Topping	Marion.

Chasse Mfg. Co.	Middletown.
D. B. Crist.	Middleville.
Willis Halsted	Middleport.
Witherbee, Sherman & Co.	Mineville.
R. R. Ripley.	Morris.
Martin & Stecher.	Nanuet.
Newfane Basket & Mfg. Co.	Newfane.
Chesebro-Whitman Co.	1167 1st Ave., New York City.
Grausam & Sachs.	1269 Broadway, New York City.
New York Ladder Co.	580 Hudson St., New York City.
Geo. T. Sargent Co.	289 Fourth Ave., New York City.
Ullman Mfg. Co.	New Yrok City.
S. W. Johnson & Son.	Nichols.
J. R. Davis	Niverville.
Buffalo Sled Co.	North Tonawanda.
Hutchins-Kilbourn Co.	North Tonawanda.
Geo. Wheeler	Norwich.
Odessa Mfg. Co.	Odessa.
Chas. Carpenter	Orwell.
Robt. G. Potter.	Orwell.
C. E. Post.	Palenville.
Peekskill Hat Mfg. Co.	Peekskill.
S. W. Brown.	Pepacton.
Thos. McWhinnie	Poughkeepsie.
C. C. Kirkland	Pratts Hollow.
E. Dipse Furniture Co.	Pulaski.
W. M. Wilder.	Pulaski.
F. B. Pease Co.	Rochester.
Salem Mfg. Co.	Salem.
Sidney Novelty Co.	Sidney.
Lyons Mills	Solsville.
Smith & Smith.	Springville.
W. S. Cure.	Stamford.
Jaburg Mfg. Co.	Stapleton.
Lee L. Hall.	Stony Creek.
John Marcellas Mfg. Co.	Syracuse.
B. Howard	Tannersville.
W. L. Johnson.	Theresa.
Tonawanda Advertising Co.	Tonawanda.
D. W. Sayer.	Unionville.
John S. Tilley.	Watervliet.
American Novelty Co.	Wellsville.
August Guntlow, Jr.	Woodbourne.

MISCELLANEOUS.

Bungs and Faucets.

Stephen Kampf ..... Albany.

Florists' Sticks.

W. J. Cowee..... Berlin.

Scales.

Jones of Binghamton (Inc.)..... Binghamton.
Osgood Scale Co..... Binghamton.

Embalming Boards.

B. F. Gleason Mfg. Co..... Brockport.

Dynamite.

Dupont & Nemours Powder Co..... Brown Station.

Fiber Board.

Beaver Co. ..... Buffalo.

Hames.

U. S. Hame Co..... Buffalo.

Yokes.

L. A. Miller..... Cairo.

Matches.

Glens Falls Match Co..... Glens Falls.
Diamond Match Co..... New York.

Kiln Slats.

Munnsville Plow Co..... Munnsville.

Butchers' Blocks.

Thomas Farrell ..... New York.

Sewing Machines.

Singer Mfg. Co..... New York.

Fillers for Rails.

G. F. Smith..... New York.

Drying Slats.

O'Dell Bros. ..... Webster.

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HOLZER BINDER BOSTON MASS